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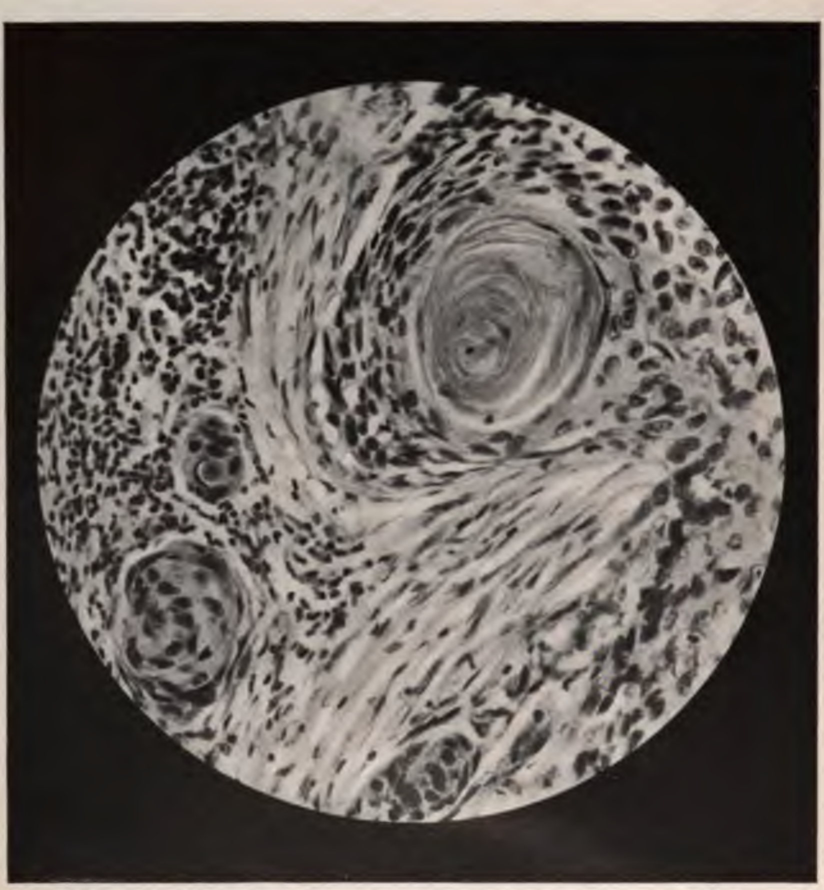

Epithelioma of the anus (× 250): Above is a cell-nest, or epithelial pearl, composed of horny material, the product of the surrounding layers of epithelial cells, representing the rete Malpighii of the epidermis. On the right of the pearl can be seen some traces of the stratum granulosum between the horny material and the epithelial cells. Outside of the epithelial layers is a stroma of fibers and spindle-shaped cells, indicating the white fibrous tissue of which it is composed. To the left are two small epithelial pearls in an earlier stage, enveloped by an area of round-cell infiltration called into existence by the irritation caused by the advancing growth.

CONSTIPATION

AND

INTESTINAL OBSTRUCTION

(OBSTIPATION)

BY

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PREFACE

THE object of this volume is to present to the profession a concise and practical treatise on the etiology, pathology, symptoms, diagnosis, and treatment of *constipation* and *obstipation* (intestinal obstruction). During the past fifteen years such flattering success has been mine with the non-medical and surgical treatment of these affections that I have thought it worth while to emphasize in this work the drugless management of constipation and obstipation. From what I have been able to find in the literature and from my conversations with medical men, in addition to my favorable experience, I feel that the manifold benefits to be derived from psychotherapy, diet, and physical measures, such as bodily movements, massage, mechanical vibration, and electricity, have not received the marked attention they deserve by physicians in general when outlining a plan of treatment for the relief and cure of the different types of costiveness. When discussing the various non-medicinal measures designed for the relief of this complaint I have endeavored to point out as closely as possible their exact indications, and to give briefly, in simple language, the technic of their application.

Standard works describe at great length acute obstipation, and pay considerable attention to chronic obstruction induced by the more serious lesions of the bowel which threaten life, but have little or nothing to say regarding the milder types of chronic obstruction (obstipation), which are in themselves sufficient to interfere with the regularity of the stools and cause slight discomfort, but which rarely end in death. It has been my especial object in this volume to call particular attention to the various mechanical or surgical causes of constipation and make plain the steps in the different operations required for their correction or removal. Although in a position to adduce hundreds of clinical observations in support of my line of argument, I have refrained from incorporating a number of case-histories, partly for lack of space and partly because individual cases are of little interest to others than the physician who has been associated with them. Drugs are rarely employed by me in the curative treatment of constipation because I can obtain quicker and more lasting results by non-medicinal and, when

54317

necessary, surgical measures; but I do resort to them occasionally in the symptomatic treatment of this affection. For the benefit of those of my readers who are advocates of the management of constipation by medicine, or who, from lack of opportunity, are as yet unfamiliar with the various non-medical procedures and appliances for the relief and cure of this complaint, or not in possession of the required outfit, I have devoted two chapters in this volume exclusively to the medical treatment of constipation. The indications for the different classes of remedies are taken up in one, while the other contains a formulary of the favorite prescriptions of men prominent in the medical world, collected and put into convenient shape for the needs of the busy practitioner. I will first discuss the *educational*, *prophylactic*, *psychic*, *dietetic*, *physical*, and *medicinal* treatment of chronic constipation, after which separate chapters will be devoted to the treatment of the *complications* and *consequences* of *constipation*, *spastic constipation*, *acute constipation*, and the *constipation* of *infants* and *children*.

In this connection, I wish to express my thanks to the F. A. Davis Company, publishers of my work on "Diseases of the Rectum and Anus," for permitting me to utilize several of the illustrations which appeared in the third edition; to the Cuckier and Fleischmann Bathing Institutions, for the use of pictures taken in their establishments; to P. C. Lorenz, instrument maker, for furnishing certain instruments from which drawings have been made; to Wappler & Company and Van Houten and Ten Broeck, for the use of photographs and electric appliances employed in preparing the illustrations; to Drs. Ludwig Kast and F. Robbins, for assisting in the preparation of the manuscript; and, finally, to my publishers, the W. B. Saunders Company, for the many courtesies extended to me both before and while the book was passing through the press.

SAMUEL GOODWIN GANT.

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CONSTIPATION

AND

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CHAPTER I

INTRODUCTION

THE subject of constipation is a broad one, and covers a field which is of interest to both physician and surgeon, because of the frequency of the condition and its far-reaching effects. Costiveness may exist in the absence of any demonstrable cause, on an inherited or acquired basis, or as the result of some traceable pathologic lesion. This widespread and distressing ailment is not peculiar to any race or clime, occurs as often among the rich as the poor, is common to both sexes, and is encountered in childhood as well as in adult life and old age.

Constipation is responsible for an inestimable amount of discomfort and suffering, and its effects may be purely local or far reaching, manifesting themselves in parts far remote from the intestine. It constitutes one of the most frequent and persistent affections with which the physician has to deal, and is one which fully taxes his ability and ingenuity to relieve and cure.

Constipation is a subject frequently discussed in medical societies and the current literature of the day, yet the number of failures following its treatment is surprisingly large. The failures are due in part to the fact that physicians too frequently prescribe remedies or advocate methods which offer temporary relief because they secure an immediate evacuation, but which accomplish little toward effecting a permanent cure. Other physicians fail to cure their patients for the reason that they do not familiarize themselves with the different methods of tested value in the treatment of this affection; again, they are unsuccessful in the handling of their cases because, either through ignorance or indifference, they fail to educate the patient as to his manner of living and the proper hygiene of the bowel.

Unfortunately for this class of sufferers, the many and widely different causes of constipation are not generally understood. Frequently the costiveness is attributed to insufficient peristalsis and glandular secretion, or to atony of the intestine, when it may be due to some organic change, or to local disease in the colon, sigmoid, or rectum. From the foregoing it will be readily understood that a routine method of treatment is impracticable, and that each case requires a separate study and individual treatment.

Patients beginning the treatment should be given to understand that it will take several weeks or months to effect a cure, that they must make it their business to get well, and render the physician every assistance possible by faithfully carrying out his instructions and presenting themselves for treatment as often as requested.

It is very important that the treatment once started should be continuous, since interruptions often materially delay and prevent a successful outcome.

The proper education of the patient is a most important feature in the treatment, and it is absolutely essential that he should be taught certain things regarding his manner of living. He should know that overfeeding, fast eating, the partaking of meals at irregular hours and under unpleasant surroundings are, one and all, forerunners of constipation, and are to be avoided. He must also learn that we are creatures of habit, and that constipation is often acquired or prolonged, as the result of ignorance or indifference to the necessity of securing an evacuation daily and at a given hour, and, further, that the time spent in the toilet should not be devoted to reading, but given entirely to the emptying of the bowel.

It is necessary, in order to encourage this habit, that every house or apartment should have a sufficient number of well-lighted, comfortable, and conveniently located toilets to accommodate the needs of the household.

The clientèle of every family physician should be warned against a promiscuous taking of patent medicines, cathartics, purgatives, and enemata, because of their pernicious results and the fact that they offer no permanent relief.

In the following chapters the writer will endeavor in a plain and concise manner to classify constipation and enumerate its various causes, and show their importance alone or in combination in producing infrequent or insufficient stools. He will also discuss in detail the various non-medical and surgical means at hand of proved value in the treatment of costiveness.

It is not the object of the writer to prepare an elaborate and scientific work on constipation, but to present a thoroughly practical volume, embracing, in the main, his personal experience based upon the results obtained in many hundreds of cases of constipation treated during the last fifteen years by ***non-medicinal*** and ***surgical*** methods.

Many of the measures herein advocated are new, some being my original suggestions, but most of them are well known and have been proposed by others.

CHAPTER II

ANATOMY

In a work of this scope it is not desirable to enter into a full discussion of the anatomy of all the abdominal and pelvic organs. It is absolutely necessary, however, that every one who contemplates treating constipation should have at least a fair understanding of the anatomy of the stomach and small intestine, and a still more comprehensive knowledge of the location, construction, and variations of the colon, sigmoid, rectum, and anus. Such knowledge enables one to understand and locate causes of this complaint which would otherwise go unrecognized, and is of great assistance in understanding and putting into practice the methods herein suggested for the relief and cure of constipation.

For the above reasons the writer has deemed a brief review of the topographic anatomy desirable.

STOMACH

The stomach, as will be seen from the illustrations (Figs. 58, 59), is located about two-thirds on the left and about one-third on the right side of the abdomen immediately below the diaphragm. It has a smaller and greater curvature, the former looking upward and to the right and the latter downward and to the left. The entrance (esophageal opening) to the stomach is to the left, near the median line, while its outlet (pyloric opening) is lower down and a little to the right of this central line.

After the abdomen has been opened, it will be found under normal circumstances that the pancreas, spleen, and most of the left kidney are completely hidden by the stomach, but a further study will reveal the liver and small omentum to the right above, and the transverse colon and great omentum immediately below it.

The stomach consists of four coats: The serous, which has no significance in so far as this work is concerned; a muscular, with its outer or longitudinal layer, its middle circular and its oblique internal layer; the submucous, containing the vessels and nerves; and the mucous membrane, with its many long irregular folds and its cardiac and pyloric glands.

SMALL INTESTINE

The small intestine extends from the stomach to the caput coli, from which it is separated by the ileocecal valve. It consists of numerous irregularly arranged convolutions, is about 20 feet in length, is considerably larger at its commencement than where it joins the colon, and holds 12 pints or about 6 liters. It is divided into three parts—namely, the duodenum, jejunum, and ileum. The duodenum, or first part, is 10 inches in length; the jejunum and ileum make up the remainder.

The small intestine has three coats: The serous, the muscular (longitudinal and circular fibers); the submucous, containing the blood-vessels, nerves, and lymphatics; and the mucous, with its goblet cells, Brunner's glands (in duodenum), crypts of Lieberkühn, villi, valvulæ conniventes, solitary glands, and Peyer's patches.

The blood supply of the small bowel is derived mainly from the superior mesenteric artery, and the nerve supply principally from the superior mesenteric plexus.

LARGE INTESTINE

The large intestine (Fig. 58) is that part of the alimentary canal extending from the ileocecal valve to the anus. It is so named because when undistended it is considerably larger than the preceding portion of the bowel.

It is further differentiated from the small intestine by its nearly constant position, thicker walls, sacculated contour, its appendices epiploicæ, its longitudinal bands, and its greater degree of fixation. It varies between 5 and 6 feet (1.6–1.9 m.) in length, and its caliber varies from 1½ to 2½ inches (4–6 cm.), being widest at the cecum, from which point it gradually diminishes in size as far as the rectum; here it again increases materially, and so continues until the anal canal or narrowest part of the intestine is reached.

For convenience of study and to make plain to the reader its course and its peculiarities at different points, the large intestine is subdivided into the colon, sigmoid colon, rectum, and anus, and will be fully discussed under these anatomic headings (Figs. 3, 4, 58).

Colon.—The colon is that horseshoe- or U-shaped portion of the large bowel surrounding the small intestine, having its beginning at the cecum in the right iliac fossa, and terminating at the sigmoid colon in the left iliac fossa, at the outer border of the left psoas muscle. It progressively diminishes in size, from the cecum down to the rectum. According to Gray, the distended cecum has an average diameter of 3 inches, while the descending colon measures about 1½ inches.

Beginning at the ileocecal valve in a blind pouch (the cecum), the colon passes upward to the liver (ascending colon), where it describes a sharp turn (hepatic flexure) and extends across the abdomen to the spleen (transverse colon), where it again turns sharply downward (splenic flexure), and proceeds until it reaches the left iliac region, where it becomes continuous with that irregular shaped part of the bowel called the sigmoid flexure.

The cecum, the ascending, the transverse, and the descending colon constitute the principal divisions of this part of the bowel, and because of their importance in the study of constipation the anatomy and peculiarities of each will be separately discussed.

Cecum.—The cecum or blind pouch, the largest part of the colon, measuring 2½ inches (6 cm.) in both its vertical and transverse diameters, is located in the right iliac and hypogastric regions, at the middle of Poupart's ligament. The lower end is directed downward and the other upward; and it is supported and held in position by the peritoneal folds covering its lateral and anterior walls. The cecum is separated from the small intestine (ileum) which joins it from below by the ileocecal valve; an arrangement designed by Nature to prevent fecal or other discharges from entering the small intestine after they have once found their way into the large bowel.

The ileocecal valve is unique in its construction and effectively prevents the regurgitation of solids, liquids, and gases, which may have accumulated naturally or have been introduced by artificial means. The valve appears as a slit-like opening running at a right angle to the long axis of the bowel; its edges are thickened and form lips which are reënforced by strong muscular fibers.

As the cecum and large intestine become distended, these lip-like valvular folds are firmly pressed together, and are so arranged that the contents of the small intestine have free exit through it into the colon; but nothing from the latter can reënter the upper bowel except in rare instances and under great pressure. In this connection it is necessary to refer briefly to the *vermiform appendix*, a blind tube, leading off from the cecum, varying in length from 3 to 5 inches (7–13 cm.) or longer, and of the same general construction as the other parts of the large intestine. It is about the size of a lead pencil, is attached to the lower and inner surface of the cecum, and is of importance because it frequently becomes inflamed as a result of constipation and fecal impaction; and, conversely, when it becomes diseased itself it may induce costiveness.

Sigmoid Colon (Sigmoid Flexure).—The sigmoid colon begins at the termination of the descending colon in the left iliac fossa, at the outer border of the psoas muscle, on a level with the crest of the ileum; and joins the rectum at a point opposite the third sacral vertebra.

That part of the sigmoid flexure which extends between the latter point and the sacro-iliac articulation was formerly considered by anatomists as a part of the rectum, but at present it is regarded as a part of the sigmoid colon. This change in the topography is a rational one because it fixes a definite dividing line of practical surgical importance, since the sigmoid or part of the colon above this line has a mesentery, while that below has none. Because of its irregular arrangement the sigmoid colon is described by some authorities as being S shaped (Fig. 1), while others maintain that it is Omega-like in its contour. It passes downward to within a short distance of Poupart's ligament, then from left to right until near the median line, where it drops into the pelvis, passes to the opposite side, and then upward until it emerges from the right pelvic brim, where it again makes a sudden turn and passes backward and down to become continuous with the rectum at the middle of the sacrum. The point of juncture is marked by a distinct increase in the circular fibers, producing a narrowing of the gut; this muscular ring is usually designated as the sphincter of O'Beirne (Fig. 2).

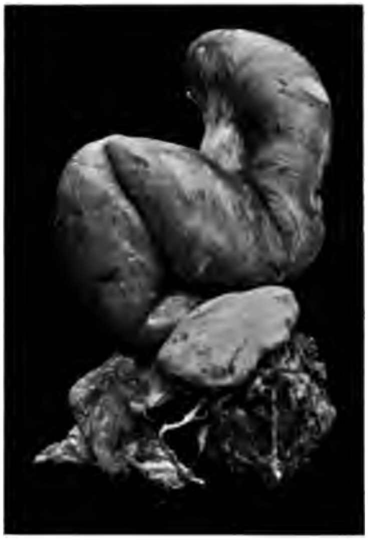

Fig. 1.—Paraffin-injected rectum and sigmoid, showing the curves, mesentery, bladder, and rectovesical fold of peritoneum. From a child three years old (author's specimen).

The sigmoid or pelvic colon is the narrowest part of the large intestine and varies greatly as regards its length and position. Its average length is 17½ inches (44 cm.). In 200 sigmoid colons examined by Byron Robinson, the longest encountered was 33 inches (84 cm.), and the shortest 5 inches (13 cm.), and these statistics show that on the average this part of the intestine is 1½ inches (3.8 cm.) longer in men than in women.

The location of the sigmoid colon is uncertain, both in health and disease. This depends upon many things—viz: (*a*) abnormalities, (*b*) its length, (*c*) length of its mesenteric attachments, (*d*) distention, (*e*) pressure of the abdominal expulsory muscle, (*f*) tumors and distention of the adjacent organs, and (*g*) sudden and violent injuries.

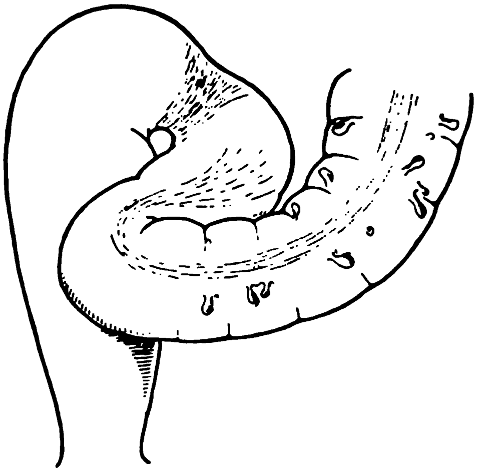

Fig. 2.—Dotted lines at rectosigmoidal juncture indicate location of O'Beirne's sphincter. An angulation of the sigmoid is shown a few inches above the sphincter

In the empty state it remains in the left iliac fossa or dips down into the pelvis, but as it fills it extends, with a rotatory motion, upward or

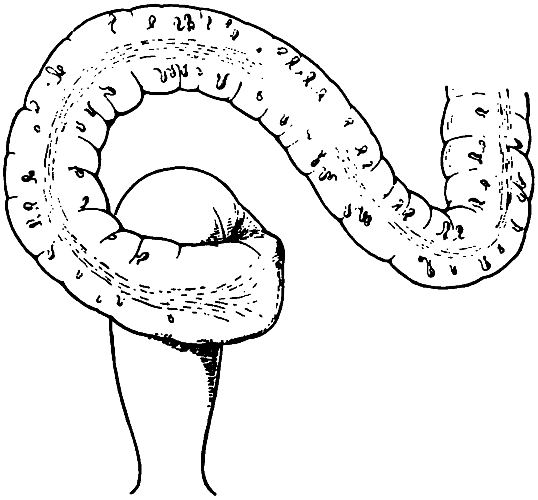

Fig. 3.—Showing sharp angulation at the rectosigmoidal juncture, caused by dropping of the sigmoid flexure over and into the right side of the pelvis.

across the pelvis and well into the right iliac fossa (Fig. 3), where it usually remains until the beginning of defecation.

In the *abnormal* state it has been encountered, either loose or bound down by adhesions, in nearly every part of the abdomen, sometimes as a straight tube and again twisted into irregular loops. These are unnatural conditions, which are always confusing to the surgeon. Under varying conditions the sigmoid colon comes into close contact with the small intestine, the anterior abdominal wall, bladder, left psoas muscle, lumbar, and sacral vertebra.

The serous, muscular, submucous, and mucous layers constitute the coats of the sigmoid colon. The serous or peritoneal coat completely envelops this part of the bowel and serves to form the mesosigmoid, which is variable in length, longer in men than in women, and serves to support and anchor the bowel. The mesenteric attachment of the sigmoid colon is very short above in the left iliac fossa and below at the rectosigmoidal juncture, but is much longer between these points, and because of its swing-like arrangement this section of the gut is capable of considerable motion and change of position. The mesosigmoid extends downward to the third sacral vertebra or beginning of the rectum.

The mucous and submucous layers so closely resemble those of the rectum that a separate description of them is unnecessary.

The muscular coat has the usual two layers of fibers, the circular and the longitudinal, but differs from other parts of the colon in that the three longitudinal bands spread out and lose their individuality as they reach the lower end of the sigmoid. The blood supply to this part of the bowel is furnished by the sigmoid arteries, derivatives of the inferior mesenteric artery. The nerves of the sigmoid are derived mainly from the sympathetic system, but the cerebrospinal system furnishes a few which come from the lumbar and sacral plexuses.

Before describing the rectum, I wish to call attention, because of its surgical importance, to the intersigmoid fossa, a funnel-shaped depression situated underneath the sigmoid colon, in the immediate vicinity of which are located the iliac and mesenteric arteries and some of their branches (sigmoid vessels)

The Rectum (Rectus, Straight).—The inferior portion of the colon and alimentary canal is called the rectum (Fig. 4), or straight intestine, a misnomer in the human species. The term originated from the straight form which this organ usually presents in the lower animals. It is tubular, devoid of longitudinal bands, and is narrower at its junction with the sigmoid flexure (sphincter of O'Beirne) and at the anal extremity. The anterior and posterior rectal walls above the levatores ani muscles remain in contact, forming a transverse slit, while the lateral walls below it (anal canal) are in apposition, forming an anteroposterior slit.

The rectum varies in length from 4 to 5½ inches (10–14 cm.), extending from the third sacral vertebra to the anus. It descends obliquely forward and downward for about 3 inches (7.5 cm.), at which point it is found opposite the apex of the coccyx; from this point it turns upon itself and passes backward and downward for about 1½ inches (3.8 cm.), thus completing its course to the anus. It is obvious that in introducing the finger into the rectum it should be passed upward and forward. It is slightly longer in men than in women and in the aged than in the young. The above dimensions do not correspond with the description given by many authorities, for the reason, as above stated, that the segment of the rectum extending between the third sacral vertebra and the lower left iliac fossa is now considered and classified as a part of the sigmoid colon.

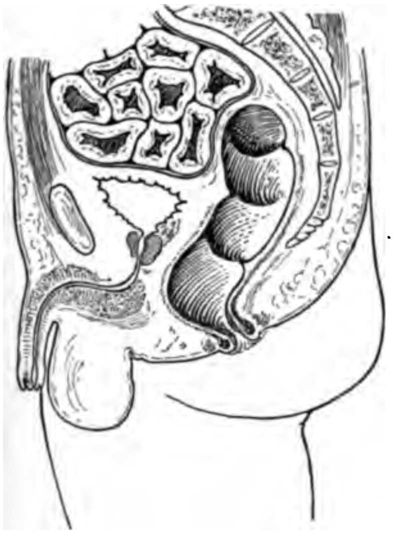

Fig. 4.—Topography of the rectum.

This change in the topography of the rectum is, in my opinion, both rational and practical, because with this arrangement the bowel above the dividing line at the third sacral vertebra has a mesentery, while that part below it has none.

For clinical purposes the rectum may be subdivided into two parts: the movable rectum and the anal canal (fixed rectum).

The movable rectum is that portion of the lower bowel which begins on a level with the middle of the third sacral vertebra and terminates about the crossing of the levatores ani muscles or at the upper margin of the internal sphincter. This is the largest part of the rectum and is known as the ampulla. It is capable of being moved laterally or vertically. It may be distended by inflation, and then appears to be divided into compartments of variable size, depending on the number of Houston's valves present and the distance between them. Because of this arrangement, Martin (*Phila. Monthly Med. Jour.*, 1899) suggests that the lowermost chamber be considered as the first rectal chamber; the cavernous area beyond the first valve and below the second should be called the second rectal chamber; and the uppermost, the third or perhaps fourth, according to the number of valves present (Fig. 5). The upper rectum is less sensitive than the lower, as is shown by the slight pain caused by surgical interference, extensive ulceration, or malignant disease in this region.

The *anal canal* is that portion of the rectum lying between the levator ani above and the anus below; it is surrounded by the hemorrhoidal plexus and is embraced by the external and internal sphincter muscles.

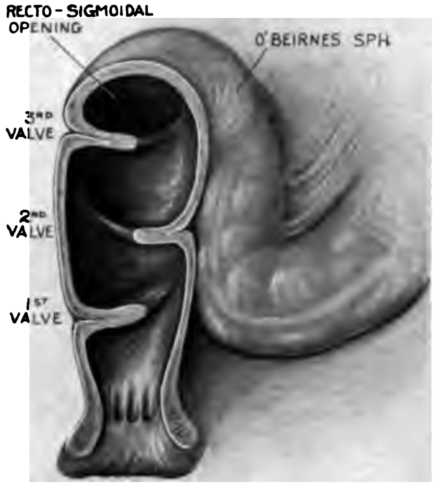

Fig. 5.—Showing entrance to sigmoid flexure and location and make-up of the rectal valves.

The rectum has four coats: Peritoneal, muscular, submucous, and mucous; the first being only partial, while the others are continuous throughout.

Peritoneal Coat.—At its commencement the rectum is surrounded by peritoneum, which binds it to the sacrum; lower down it covers the anterior surface only, and is then reflected on to the bladder, forming the rectovesical pouch (Fig. 6), or to the uterus (Douglas' cul-de-sac). The peritoneum may extend down to within 1 inch (2.54 cm.) of the prostate. The distance is subject to variations. In the newborn it may extend to within ½ inch (1.27 cm.) of the anus. The distance increases, however, after the fifth year, and in old age, accompanied by prostatic enlargement, the peritoneum is found very high up (Fig. 7).

The author's experiments and observations have demonstrated that 2½ inches (6.35 cm.) in the male, and 3½ inches (9.9 cm.) in the female, with 1 additional inch (2.54 cm.), when both bladder and rectum are distended, is about the average distance from the anus to the peritoneal attachment.

Muscular Coat.—This coat is thicker and stronger in the rectum than in other parts of the large intestine. It consists of two layers—viz: circular or inner and longitudinal or outer. The circular fibers are neither numerous nor strong in the upper rectum, but become more numerous and stronger at the lower end of the rectum, where they form a muscular band about 1 inch (2.54 cm.) in width, called the internal sphincter. At certain points, particularly at the rectosigmoid juncture (O'Beirne's sphincter) and where the bowel dips in to form the rectal valves, the circular fibers are increased in number and have a fan-shaped distribution (Fig. 14).

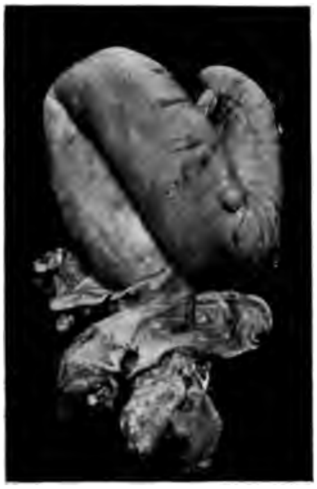

Fig. 6.—Showing angulation of the sigmoid, peritoneal attachment, and part of the bladder. Also shows how the sigmoid bends backward and downward, partially covering the rectum (author's specimen).

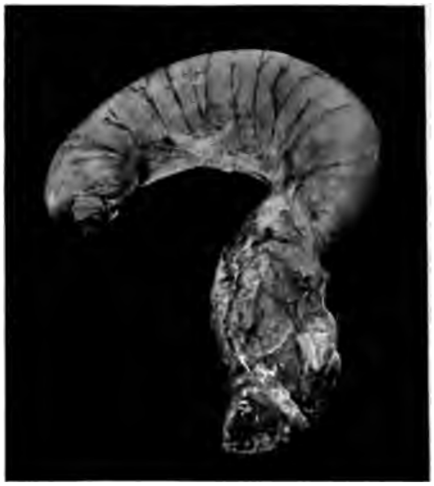

Fig. 7.—Lateral view of paraffin-injected rectum, showing mesentery, direction of blood-vessels, and peritoneum binding the rectum and sacrum together (author's specimen).

The longitudinal fibers are partly prolongations of those coming from the colon, where the three longitudinal bands spread out, but some are peculiar to the rectum. They are partly developed in childhood and are more numerous in the anterior and posterior portions of the rectum.

Submucous Coat.—This coat consists of a layer of more or less dense connective tissue in which the blood-vessels, nerves, and lymphatics ramify. It is sufficiently lax to permit of free gliding of the mucous membrane over it. In inflammatory disease of the rectum the submucosa often becomes thickened, indurated, rigid, and adherent to the muscular layer, thereby interfering with the mobility of the mucous membrane.

Mucous Coat.—The mucous membrane of this region is much thicker, more generously supplied with blood-vessels, and glides over the underlying structures more freely than in other parts of the colon. When the rectum is empty, the mucosa of the upper part is thrown into a multitude of superficial transverse velvety folds which are obliterated by distention. There are from two to seven folds (Houston's valves), which stand out more prominently when the bowel is distended, and because of their importance as a cause of constipation they will be fully described a little further on.

The epithelium covering the mucosa is of the columnar variety. Numerous crypts of Lieberkühn are found in the mucous membrane, and beneath them the solitary lymphoid nodules. The tubular or mucous secreting cells are so numerous that when viewed through a lens the membrane presents a honeycombed appearance.

The absorbing power of the rectal mucosa is remarkable, a fact clearly demonstrated by the good results obtained from rectal alimentation and medication.

Beginning just above the mucocutaneous junction (Hilton's white line) and extending upward for a distance of ⅓ to ⅝ inch are several (four to fourteen) projecting longitudinal folds caused by sphincteric contraction and known as the *columns of Morgagni* (Fig. 14). These plicæ are broader above than below, contain some muscular fibers, and are difficult to efface.

Suspended from between the lower extremities of Morgagni's columns are transverse cup-shaped folds of the mucosa from 1/12 to ⅛ inch in depth, which are designated as *semilunar valves* or *crypts* (sacculi Horneri, Fig. 14), the function of which is to collect mucus and hold it for the lubrication of the feces during defecation.

Located at the lower end of Morgagni's columns are several minute elevations (*anal papillæ*, Fig. 8), composed chiefly of stratified epithelium and a slight amount of connective tissue, each containing an arteriole and a nerve filament.

Sometimes a semilunar valve becomes the outlet for a fistula (Fig. 8) or the seat of some other disease, and occasionally the papillæ become inflamed and cause more or less irritation. Because of this, self-styled "orificial surgeons" have written *in extenso* about the frequency of disease in the anal pockets (semilunar valves) and papillæ, and would lead one to believe that they are the most fruitful sources of human suffering, when, in reality, such is seldom the case.

Rectal Valves (**Houston's,** Figs. 5, 9–12, 13).—In the rectum above the anal canal are some large permanent oblique semilunar folds which project for a considerable distance into the lumen of the bowel; these have a very interesting history and have been the subject of much controversy.

The following description of the constancy, location, and structure of the valves is based upon personal research, clinical and experimental, which, in the main, confirms the experiments of Houston, Otis, Martin, and Pennington.

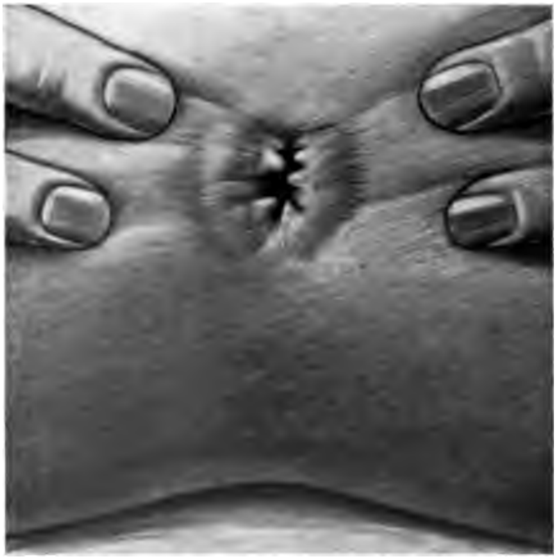

Fig. 8.—Anal papillæ.

In the writer's opinion there is sufficient evidence to warrant the assertion that the third sphincter and the various folds, muscles, rings, and bands described by Houston, Nélaton, Hyrtl, Kohlrausch, Martin, Pennington, and Cook are one and the same thing, namely, "valves of Houston."

Houston's "valves"[1] are permanent anatomic structures (made more apparent by distention), capable of demonstration in either the living or the dead fetus, infant, child, or adult; except in those instances in which they have been destroyed by disease, or in which, because of pathologic changes in the gut-wall, rectal inflation is impossible. They are crescent shaped, capable of vertical motion, extend from one-half to two-thirds around the circumference of the rectum (Figs. 9, 14), and project into its lumen from ¾ to 1½ inches (1.9–3.8 cm.). They are directed obliquely to the long axis of the bowel and are slightly cup shaped, their concavities looking upward (Fig. 9). When the bowel is inflated the free margins of the valves stand out prominently and are easily seen through the proctoscope (Fig. 11), or they may be felt by the finger during straining.

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[1] For the complete history and a detailed description of Houston's valves, the reader is referred to Gant, *Diseases of Rectum and Anus*, third edition, pp. 20–29, 1905.

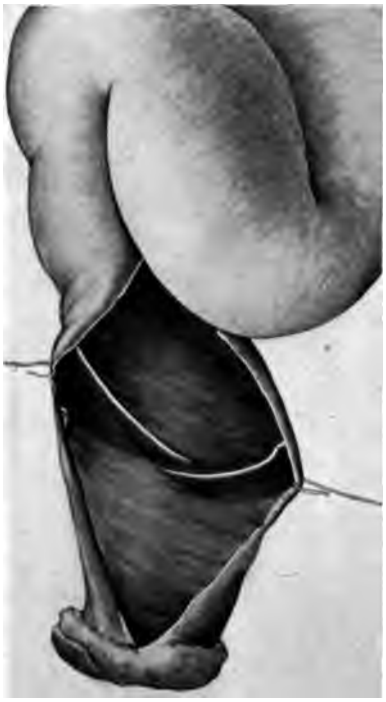


Fig. 9.—Paraffin-injected rectum with cast removed, showing two rectal valves, one just above the other, on opposite sides of the bowel (author's specimen).

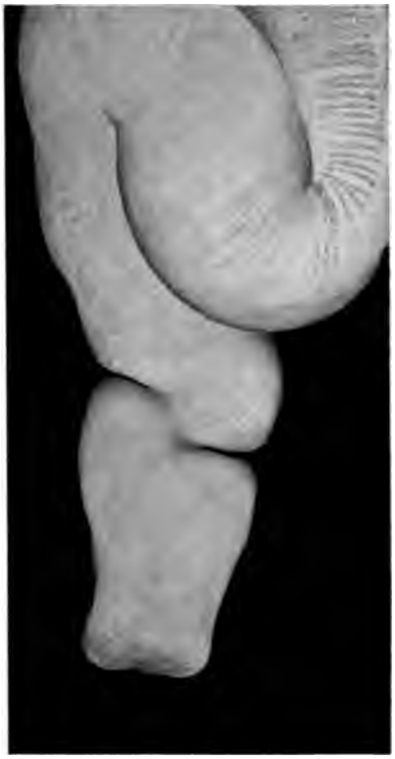


Fig. 10.—Paraffin cast removed from the rectum, showing indentations made by the valves (author's specimen; cast from Fig. 9).

The number of valves is variable. Usually there are three, sometimes two or four (Figs. 11, 14); in exceptional cases there may be five, six, or even seven. When more than the usual number are present, some of them are small, shallow, and less prominent. The location of the valves is fairly constant and is as follows: The upper valve, at the junction of the sigmoid colon and rectum on the left rectal wall; the middle, most prominent (Kohlrausch's plicæ recti) valve, on the right anterior wall opposite the base of the bladder and 3 inches (7.62 cm.) or more above the anus; the lower valve, on the left side, a short distance below the middle valve (Fig. 5). With the patient in the knee-chest position and the rectum well inflated, one can sometimes see, by the aid of the proctoscope, all the valves at the same time (Fig. 31). In exceptional cases the valves may be located one above the other or almost directly opposite each other (Fig. 28), completely hiding from view the lumen of the bowel above them. Generally, however, they form a sort of

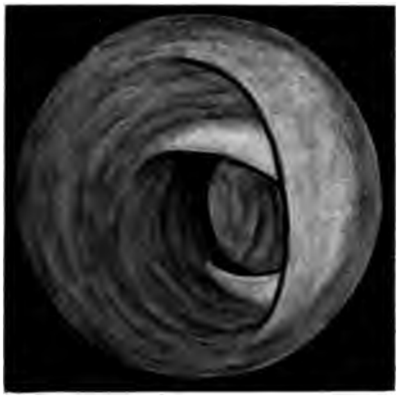


Fig. 11.—Appearance of the rectal valves as seen through the proctoscope after the rectum has been inflated.

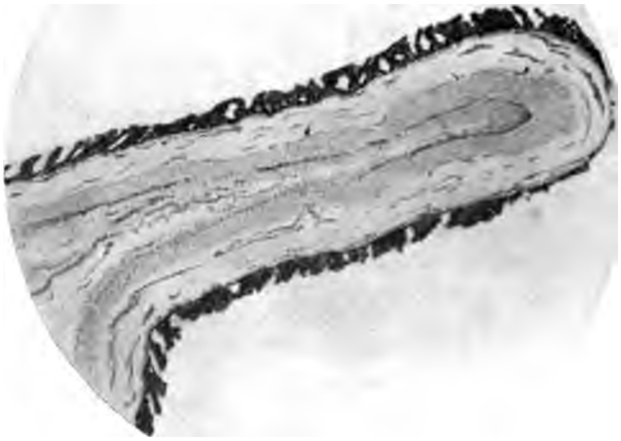


Fig. 12.—Microphotograph of rectal valve. Tip of rectal valve, showing mucosa, submucosa, and muscular coat (author's specimen).

spiral stairway, which gives a rotatory motion to the fecal mass on its journey from the sigmoid to the anal canal (Fig. 11).

The structure of the valves has been the subject of much controversy. The difference of opinion has probably arisen from the fact that their structure may vary in the same subject and under the same conditions, and that the make-up of the normal is always different from that of the hypertrophied or diseased valve. The average valve is composed of: (*a*) Mucous membrane; (*b*) submucosa (fibrous layer); (*c*) circular muscular layer; (*d*) longitudinal muscular layer; (*e*) subserous layer, consisting of areolar tissue and fat, arteries, veins, nerve-elements, and lymphatics. The mucous membrane covering the valve is of variable thickness and continuous with the membrane at the base of the valve (Fig. 13). It consists of the epithelial lining, the stroma, and the muscularis mucosa, which is more prominent here than in other

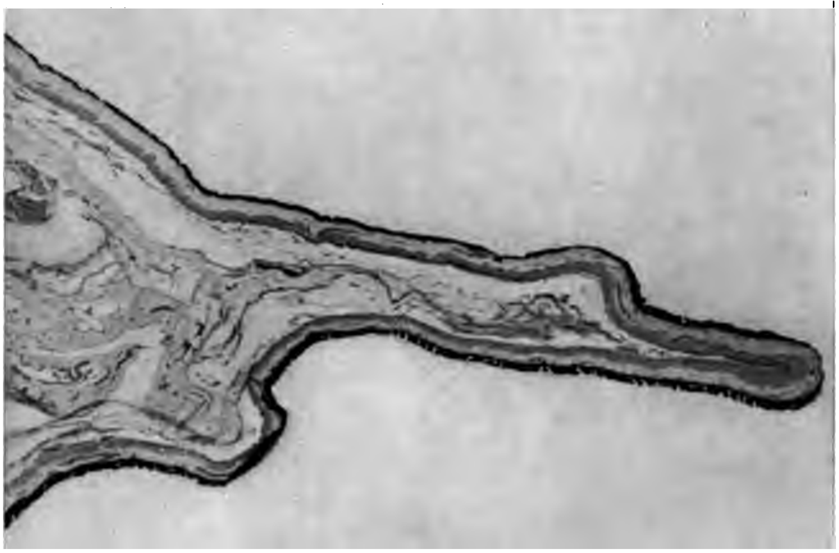


Fig. 13.—Microphotograph from author's specimen, showing how the rectum projects inward to form a valve, and the mucous, submucous, and muscular coats which compose it.

parts of the rectum. The submucosa is composed of white fibrous connective tissue, sometimes forming a dense layer (Figs. 12, 13), and was first described by Martin, who maintains that it gives support to the valves, especially when they are hypertrophied.

The circular layer of muscular fibers is usually constant, and may extend only a short distance into the valve or almost to its tip (Fig. 12). The longitudinal layer is present less often than the circular, and may extend across the base of the valve without contributing any fibers to its structure; or it may dip into the valve, reaching nearly to the distal end (Fig. 13). In addition to these structures, Pennington reports finding in the valve lymph-nodes, large sympathetic ganglia, epithelial structures imbedded in the loose tissue outside the longitudinal muscular layer, and in one specimen white fibrous and yellow elastic tissue in the same locality.

While the muscular coat usually enters into the structure of the valves, the latter are sometimes made up entirely of mucosa and submucosa.

The various elements composing the valves are, as a rule, more clearly defined in the adult than in the infant. These folds or valves have no propulsive power, as the earlier authorities believed, but they do check the downward course of the feces by projecting into the bowel, and thereby lessen incontinence where the sphincters have been destroyed. In such cases the writer believes that the levator ani muscles, which are partly under the control of the will and which may acquire a degree of sphincteric action, do much to prevent and lessen incontinence.

ARTERIES

The arteries of the rectum are derived from three distinct sources:

(1) The superior hemorrhoidal, from the inferior mesenteric.

(2) The middle hemorrhoidal, from the hypogastric or a branch of the internal iliac.

(3) The inferior hemorrhoidal, from the internal pudic after it has reëntered the pelvis.

The superior hemorrhoidal artery descends through the mesorectum and divides into two branches, which course along the posterior wall of the rectum. They are at first superficial, but soon perforate the muscular coat and give off a number of branches which anastomose in the mucous membrane and submucosa, not only with each other, but with the middle and, frequently, with the inferior hemorrhoidal arteries. The main branches run parallel with the bowel. This accounts for the slight bleeding from incisions made parallel with the long axis, and the profuseness of hemorrhage from those made at a right angle to the bowel.

The middle hemorrhoidal arteries vary in size, and take an oblique course downward to supply the middle third of the rectum.

The inferior hemorrhoidal arteries and branches pass upward as well as downward to anastomose with the other hemorrhoidal arteries and to supply the levator ani and sphincter muscles, and the cellular, fatty, and tegumentary tissues in the anal region.

VEINS

The veins correspond in name with the arteries; the middle and inferior hemorrhoidal veins return the blood from the anal region to the internal iliac. The hemorrhoidal plexus of enlarged and anastomosing veins is situated in the lower part of the rectum, and from it proceeds the "superior hemorrhoidal vein," which has no valves, but which returns the blood from the rectum to the portal system (Fig. 7). Quénu believes this plexus communicates freely with the branches of the inferior hemorrhoidal, but that it has little in common with those of the middle hemorrhoidal veins. The superior hemorrhoidal vein and its branches pass upward under the mucous membrane for a distance of about 3 to 4 inches (7.62–10.16 cm.), then perforate the muscular coat at four or five points, and can be seen on the outside of the bowel. Verneuil has laid much stress on this anatomic fact, claiming that the veins pass through buttonholes, which have the power of contracting around them, closing their caliber, and preventing the return of the blood to the *liver.* In this anatomic arrangement, he believes, is to be found the active cause of internal hemorrhoids.

NERVES

The nerves are derived from the two great classes which go to make up the nervous system: the cerebrospinal and the sympathetic. Those originating from the former come from the sacral plexus, and those of the latter from the mesenteric and hypogastric plexuses. The muscles of the anal region are supplied by branches of the sacral nerves, while the superficial perineal, a branch of the pudic, supplies the levator ani and the skin in front of the anus. The inferior hemorrhoidal of the pudic nerve, sometimes arising independently from the sacral plexus, supplies the lower end of the rectum and anus. The pudic is controlled by the same part of the cord as the sciatic. Hence, irritation from a fissure or ulcer located within the anus may be transferred down the limbs or to other distant parts. The intimate relation of this nerve to the genito-urinary organs explains the frequency with which disorders of micturition are associated with rectal affections. The upper and middle portions of the rectum are much less sensitive than the lower, as has been proved by experiments made by Bodenhamer. The pain increases in proportion as the disease encroaches upon the anal margin; hence, disease, malignant or otherwise, situated high up may cause but little pain.

The *sympathetic nerve* is distributed to the rectum and anus, and is derived from the hypogastric, which is formed by branches from the aortic plexus. It also receives branches from the lumbar and sacral plexuses. The controlling center of the anorectal and genito-urinary apparatus is on a level with the first lumbar vertebra.

The local reflex of the small intestine is in *Auerbach's plexus* (Gray). This is a network of nerves and ganglia between the longitudinal and circular muscle-fibers, which sends nerve-branches to the muscular layers of the bowel; the perforating branches, after they have pierced the circular muscular layer, forming *Meissner's plexus*. From its site between the muscular and mucous coats of the intestine, this plexus sends terminal fibers to the muscularis mucosæ, the villi, and the mucous membrane.

LYMPHATICS

The absorbent vessels of the anorectal region are of goodly size and much more numerous than is generally supposed. They consist of two systems, those of the skin and anus being distinct from those of the rectum, the former going to the inguinal and the latter to the sacral and lumbar glands.

The gluteal glands derive their lymph from the buttocks and convey it to the iliac nodes.

MUSCLES

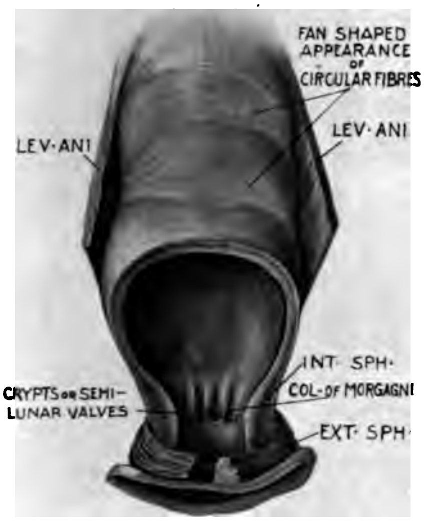
The muscles of the rectum, which are of special interest in the study of constipation, are the external sphincter, internal sphincter, the transversus perinei, rectococcygeus, and the levator ani (Fig. 14).

The **external sphincter** muscle is voluntary, and is situated immediately beneath the integument at the anal margin. It is about 3 inches (7.62 cm.) in length (Fig. 14), ½ inch (1.27 cm.) broad, and is not thicker than the blade of a penknife. It arises from the tip of the coccyx, and after surrounding the anus in the form of an ellipse, is inserted into the central tendon of the perineum.

The function of this muscle is to close the anal orifice and to assist in the expulsion of the feces, acting in conjunction with the abdominal and levator ani muscles.

Its nerve supply is derived from the fourth sacral and the inferior hemorrhoidal of the internal pudic, and the center controlling it is situated in the lumbar enlargement of the cord.

The **transversus perinei** muscle arises by a narrow tendon on the anterior surface of the tuber ischii, and passes forward and inward to be inserted into the center tendon of the perineum, and in the female, with the posterior attachment of the vaginal sphincter. According to Cruveilhier, it aids in defecation by pressing the anterior and posterior walls of the bowel together in conjunction with the external sphincter.


FAN SHAPED APPEARANCE OF CIRCULAR FIBRES
LEV·ANI
LEV·ANI
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CRYPTS OR SEMI-LUNAR VALVES
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Fig. 14.—Showing the relations of the structures which enter into the make-up of the lower rectum and anus.

The **internal sphincter** (Fig. 14) is a flat involuntary muscular band formed by a collection of fibers of the circular coat, and is located immediately above the anal sphincter. It is about ¾ to 1 inch (1.9–2.54 cm.) in width and ⅙ inch (4.2 cm.) in thickness. Its fibers are somewhat finer and paler than those of the external sphincter.

The **rectococcygeus** embraces the lower end of the bowel in a fork-like extension and draws the rectum upward toward the apex of the coccyx after it has been forced down during stool.

The **levator ani** muscle (lifter of the anus Figs. 14, 15) has been the subject of much discussion, especially as regards its function, origin, and insertion. It rises from the pelvic fascia and from the inner surface of the symphysis pubis, the fibers passing downward, some to be inserted into the perineum, others into the coccyx, and still others into the rectum, on a level with the upper part of the anal canal.

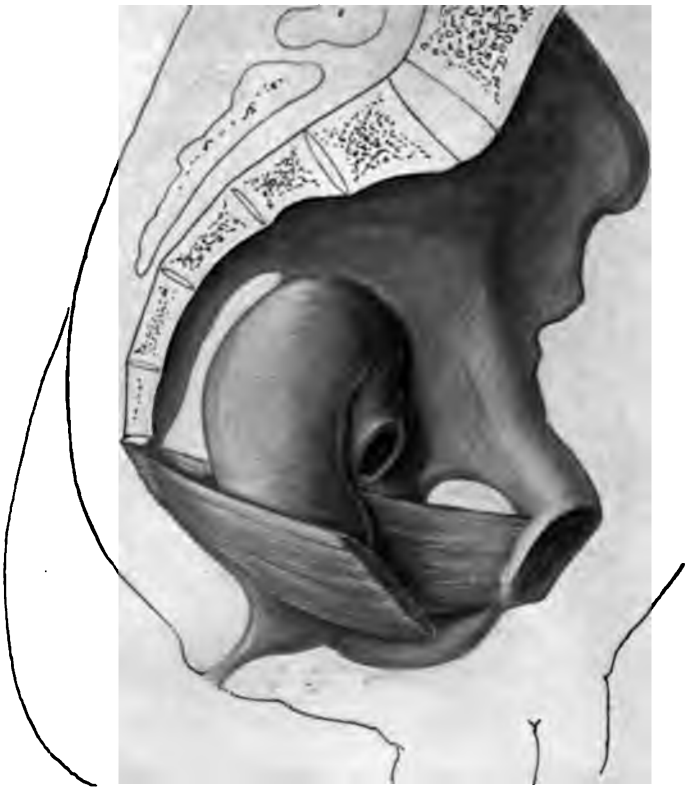

Fig. 15.—Showing the relations of the levatores ani to the rectum.

In resection of the rectum it is impossible to free the lower end of the bowel until these latter fibers are divided.

The action of the levator ani, in so far as the rectum is concerned, is to compress the sides of the bowel and neck of the bladder, and in the act of defecation, when the sphincter relaxes to open the anus, it closes the urethra. This explains the well-known difficulty of voiding the urine and feces at the same time.

The levator ani forms a large part of the pelvic floor (Fig. 15) and helps to support the pelvic organs. It has to a slight degree a voluntary action, which can be demonstrated by introducing the finger into the bowel and requesting the subject to draw up the anus as much as possible, when a contraction will be felt above the finger from 1½ to 2 inches (3.8–5.68 cm.) above the anal orifice.

This action, which Mr. Cripps attributes to the levator ani, would in part account for the control of the bowel that is frequently observed after complete destruction of the external and internal sphincter muscles. Again, after certain rectal operations, where the sphincter has been divulsed or incised, patients complain of a sudden jerking in the lower rectum, which is due to the contraction of the levator ani muscle.

The accompanying figure shows very nicely the relation of these muscles to the rectum.

Relations of the Rectum.—The rectum is in close apposition anteriorly with the small intestine, rectovesical pouch, bladder (Figs. 1, 4, 6, 7), prostate, seminal vesicles, and urethra in the male; and with the uterus, vagina, Douglas' cul-de-sac, and the small intestine in the female; posteriorly, with the mesorectum, left pyriformis muscle, sacral plexus, coccyx, Luschka's gland, and coccygei muscles.

The rectum obtains its support principally from the peritoneum above and from the external sphincter, rectococcygeus, and levator ani muscles below. Some of the fibers of the latter blend with the rectum, while others pass by it on their way to be inserted into the coccyx.

Perirectal Spaces.—The rectum is surrounded by loose connective tissue and fascia, the latter derived principally from the pelvic fascia. "Between the rectum and the sacrum is a large space devoid of fat, called the retrorectal space, and between the rectum, seminal vesicles, and the rectovesical fascia is another space of considerable size, called the prerectal space" (Quénu).

Ischiorectal Fossæ.—On either side of the lower end of the rectum, between it and the tuber ischii, are two large triangular spaces filled with fat, which are called the ischiorectal fossæ. Within a sheath formed by the obturator fascia are the internal pudic artery, veins, and nerves. The inferior hemorrhoidal vessels and nerves pass through the central portion of the ischiorectal fossæ on their way to the anal canal, while in the anterior portion of these spaces are the superficial perineal vessels and nerves.

The fat and connective tissue filling the fossæ act as elastic supports to the rectum and serve to keep its lateral walls in contact.

THE ANUS

The anus is an oval orifice situated at the termination of the anal canal. It is located in the center of the pelvic outlet, 1 inch (2.54 cm.) anterior to the tip of the coccyx, between the tuber ischii, and, like the anal canal, has an anteroposterior slit. It is lined above by mucous membrane and below by integument, in which is found pigment, hairs, papillæ, sudoriparous glands, and sebaceous follicles, the latter supplying an unctuous secretion with a disagreeable odor. The skin about the anus is gathered into numerous radiating folds by the corrugator cutis ani muscle.

The anus may be thoroughly stretched in every direction without permanently impairing its function. In health it is closed by the external sphincter, but in certain diseases of the lower bowel the muscle may become worn out or destroyed and the anus become patulous, causing partial or complete fecal incontinence.

CHAPTER III

PHYSIOLOGY

CONSTIPATION is a disturbance in the normal discharge of the feces. This discharge represents but the last link in the chain of processes which unite to form that function of the body called digestion. It is, therefore, unadvisable even from a purely practical standpoint to consider any of the disturbances of digestion without regarding its other phases.

Every pathologic process is, in fact, only a modification of a physiologic one, and before entering into the problem of constipation it is, therefore, necessary to outline a general picture of the physiology of digestion, and point out those elements the abnormal combination of which leads to the disturbance known as constipation.

The purpose of digestion is to provide the human body with the necessary sources of energy, which is done by a mechanical and chemical action upon the food, so that it can be received in the stream of fluids and carried to those organs in which by its further decomposition they can be transformed into kinetic energy.

The system of organs which fulfil this function is the alimentary tract, including the hollow tube from the mouth to the anus, with the glands partially within its wall, partially outside of it, forming separate organs, like the salivary glands, pancreas, and liver.

The hollow organ receives the food, carries it through the body, and, after extracting the useful parts, eliminates the remainder. On its way the food must be changed mechanically and chemically to facilitate the absorption of the nutritious elements.

The mechanical change is performed by mastication and the kneading movements of the stomach and small intestine. More important than this is the chemical action, by which on the one side the mechanical action is aided by the breaking up of connective tissue and other binding mediums of the food, and on the other side those chemical changes are performed which split up the complicated into less complex bodies. For this purpose the food does not pass the alimentary canal in an even course, but is retained in different parts to be subjected to the influence of the digestive secretions, the active principles of which are represented by the ferments.

I will, therefore, consider first the chemical changes of the food, their absorption, their transportation, the expulsion (defecation) of non-assimilable elements (feces, flatus), and then enter into the corresponding pathologic conditions. For this purpose it is sufficient to bear in mind that manifold as the food of our mixed diet may be, it has finally to be changed into a few food elements and be absorbed as such. Thus, we may classify our food as carbohydrates, fats, proteins, water, and inorganic substances.

The chemical action takes place in the following manner: In the mouth, fats and proteins remain unchanged; the carbohydrates, however, undergoing chemical changes through the saliva, the active ferment of which is ptyalin or amylase. This ferment acts upon the starch, liquefying it, and converting it partially into dextrin and maltose. This amylolytic digestion continues also in the stomach until the acidity of the gastric juice checks the action of ptyalin, which requires an alkaline medium.

From now on, digestion is carried on by the gastric juice, the pepsin and rennin becoming active. Pepsin with hydrochloric acid represents the proteolytic agent which renders the insoluble proteins soluble and performs the cleavage of the protein molecule into albumoses, peptones, leucin, tyrosin, etc. Rennin curdles the milk and transforms caseinogen into casein.

Soon after these chemical changes begin, individual portions of the gastric contents are forced through the pylorus into the duodenum. As soon as an acid medium is present in the duodenum, the pylorus closes up through a nervous reflex action and remains in firm contraction until the chyme becomes neutralized and alkalinized by the secretions of the liver and the pancreas. Thus, the evacuation of the stomach is regulated from the duodenum.

After the chyme acquires an alkaline reaction, a new phase of digestion sets in, carried on by the bile and the ferments of the pancreas. One ferment of the pancreas is trypsin, the action being similar to pepsin, but only effective in alkaline medium. Another ferment of the pancreas is amylolytic and nearly identical with that in the saliva, converting starch into dextrin and maltose. Steapsin, or lypase, the lipolitic ferment, acts together with the bile upon the different fats, emulsifying them and splitting them into glycerin and fatty acids.

The secretion of the glands within the intestinal wall contains the ferment enterokinase. This ferment assists very powerfully the digestive action of the pancreatic juice and bile.

Summing up, it can be said that the chemical change of the food through digestion represents a hydrolytic cleavage into substances which are soluble in the digestive juices and are rendered absorbable.

With regard to the absorption, it can be briefly stated that the stomach plays but a minor part in this connection. The absorption of water through the walls of the stomach is hardly perceptible, while alcohol, dissolved sugar, and peptones are absorbed in small quantities. In the small intestine, the absorption of sugar, albumoses, peptones, and fats takes place on an extensive scale.

The colon takes no part in the process of digestion, but does play a very important rôle in the process of absorption. The chyme, which has already undergone digestion in the stomach and small intestine, is, as has been stated before, emptied into the large bowel in a fluid state, but during its passage through the cecum, ascending, transverse, and descending colon and the sigmoid flexure, the water and other absorbable portions of the chyme are rapidly taken up, and by the time the feces or non-nutritious part of the intestinal contents reach the rectum, it has a semisolid or firm consistence.

In studying the functions of the lower bowel, the fact must not be overlooked that the rectum possesses remarkable powers of absorption. In fact, the constitutional effects of some drugs are more quickly obtained when introduced per rectum, and in some cases a smaller dose is required than when they are administered by way of the mouth. The most striking example of absorption in the rectum and colon is shown in the benefits derived from enemata of warm saline solution after profuse hemorrhage or for the relief of surgical shock.

Furthermore, the colon seems to be the place for the absorption of toxic substances developing in the course of abnormal decomposition of proteins. This seems to be due to the influence of prolonged bacterial putrefaction or the presence of abnormal types of bacilli, which produce in the body effects of toxic character. This so-called auto-intoxication is becoming more and more generally recognized as a cause of certain obscure diseases. It is well to remember that the colon plays a very important part in this connection.

After having outlined the chemical changes of the food and its absorption, we must now consider that part of the digestive work by which is carried out the mechanical division and transportation of the food through the digestive tube.

Through mastication and through the kneading action of the stomach, assisted by the decomposing effect of the gastric juice, the food is of semiliquid consistency when it enters the duodenum, but the chyme still contains coarse particles of food, and it is left to the peristalsis of the intestine and the action of the pancreatic and intestinal juices to complete the transformation of the chyme into a sticky liquid mass. As such it appears throughout the small intestine. It shows alkaline reaction and light yellow coloring from the biliary pigment, and as yet does not develop any fecal odor.

After reaching the colon the intestinal contents show a dark-brown coloration due to the transformation of bilirubin into hydrobilirubin, and begin to assume the fecal odor, which is mainly the odor of skatol. The reaction becomes neutral or slightly acid and the protein putrefaction through bacilli becomes apparent.

From being still fluid, or nearly so, in the cecum and ascending colon, the feces assume a more and more solid shape in their further descent through the transverse colon, and downward, as the result of constant loss of water. In the sigmoid flexure the feces are prepared for final expulsion into the rectum and from the body. If detained for an undue length of time in the flexure the fecal matter is apt to harden and solidify to such an extent as to interfere seriously with normal defecation.

PERISTALSIS

A study of the methods by which the stomach and the small and large bowel propel the chyme and feces through their various convolutions and angulations is not only interesting, but absolutely essential to a comprehensive understanding of this work.

The stomach is the first reservoir of the alimentary canal where the food remains for several hours, being kneaded and mixed with the gastric juice.

Under normal conditions, shortly after meals, constrictions make their appearance in the middle of the stomach, moving in a peristaltic wave toward the pyloric end and thus expelling first only liquid contents, then also the semiliquid parts. At the end of the digestive function of the stomach, everything contained in it, including coarse particles, has been expelled.

The peristalsis of the stomach is automatic, and contractions occur even if the organ is cut out of the body or entirely separated from its nerve connections. Its motility is, therefore, governed from within its walls, but the rhythm of its peristaltic waves is subject to increasing or diminishing nervous control.

The peristaltic action of the intestines begins at the duodenum, but is not continuous throughout the length of the small bowel, as one would expect, for it is very active in one segment, while the adjoining piece remains inactive.

Pronounced peristaltic action occurs simultaneously in several almost equally divided segments of the gut, while the intermediate portions of the bowel remain in a quiescent state. After a short time the segments which have been inactive become involved in the peristaltic movement and the formerly active portions now become quiescent.

The purpose of peristalsis is threefold: To mix the chyme thoroughly with the digestive secretions, to facilitate absorption, and to move the intestinal contents toward the colon.

The peristalsis of the gut is automatic, like that of the stomach, the intestine showing motility even if entirely separated from nervous connections, unless the plexus mesentericus is injured. The reflex action of peristalsis is largely dependent upon Auerbach's and Meissner's plexus, located between the muscular layers and in the submucosa respectively (see Anatomy), where the first-named plexus receives the impulse and transmits it to the other, which sets it in motion. Both may be directly affected by purgatives and by the stimulation of electric, vibratory, and other appliances in and outside the gut.

The movements of the intestine are fourfold:

(1) Pendulum movement, produced mainly by the longitudinal muscle. A part of the gut a few inches long rotates back and forth in its longitudinal axis without a noticeable change in its lumen.

(2) Rhythmic segmentation. At regular intervals simultaneous constrictions of the gut appear.

(3) Peristaltic waves, which run over a greater or less part of the gut in such a way that a marked contraction of the circular muscles continues toward the anus. Simultaneously, the part of the gut below the constriction becomes dilated. These waves are only a few inches in length.

(4) Rolling movement, peristaltic waves, through which the contents of the intestine are carried about 5 to 6 inches toward the anus.

The above-mentioned varied movements are especially noticeable in the small gut, and under normal conditions carry the food from the duodenum to the cecum within two to six hours.

The movements of the large intestine are slower and less frequent, and can transport the contents of the cecum into the rectum within twenty to thirty hours. Beside the waves toward the anus, there appear in the colon, especially in the ascending part, waves in the opposite direction, so-called antiperistaltic waves, which occur about once in a quarter of an hour, lasting a few minutes. They contribute to move the contents of the cecum and of the ascending colon back and forth. By this action they facilitate watery absorption, which is especially pronounced in this part. The cecum, therefore, represents the second reservoir of the digestive tract.

FECES AND FLATUS

Feces.—The amount, consistence, shape, color, and reaction of the feces is variable, being subject to change in both health and disease. The healthy individual should have at least one copious fecal evacuation in every twenty-four hours; the average daily discharge is from 4 to 6 ounces (120-180 gm.) in weight, and should be composed of about 75 per cent. of water and 25 per cent. of solids.

The evacuation in health is of a firm or doughy consistence and is cylindric in shape; the feces have a light or dark-brown color, an offensive odor, from skatol (due to putrefaction), and ordinarily an alkaline reaction.

Under normal conditions the human passage consists of part of the digestive juices and the residues of the food which have not been or could not be absorbed, bacteria, a small amount of epithelial detritus, and also a small quantity of mucus. Through each of these factors the appearance and the macroscopic aspect of the feces can be more or less altered. Defecation is a complicated act, partly reflex and partly under the control of the will, a more extensive discussion of which will be found in the context.

The shape of the fecal mass varies, depending upon the percentage of water; it is usually round, about 1 inch in diameter, and from 4 to 8 inches in length. But when the amount of the contained water drops down to from 50 to 25 per cent., it loses its fluid-like consistence, and scybala, or large hard oval or small round nodular fecal accummulations are formed, which often result in fecal impaction on account of the great difficulty attendant upon their passage along the bowel or expulsion from the rectum. The normal brownish color of the feces due to bile-pigment and hematin may be changed to a light yellow during a milk-diet or bilious attack; to a dark brown or black as the result of the administration of bismuth and iron; and the evacuations of patients suffering from typhoid or cholera may become gray or greenish.

As before stated, the reaction of the feces is usually alkaline; it must be remembered, however, that an acid reaction is sometimes observed in perfectly healthy individuals, especially in those who confine themselves largely to a vegetable diet; while in those who eat largely of meat, the feces will have an alkaline reaction.

In the normal passage, remnants of the food can be detected macroscopically, such as potatoes, currants, strawberries, corn, turnips, lettuce, mushrooms, carrots, string beans, cartilage, etc. They have no value for diagnostic purposes except in so far as they indicate the nature of the food partaken of. Undigested remnants of meat, connective tissue, and fat, however, are very important and can often be detected macroscopically. The same is the case with muco-pus or blood, or with foreign bodies, concrements, and intestinal parasites.

If the microscopic examination (it is advisable to take one specimen simply spread over the glass, one diluted with water, and one thoroughly mixed with Lugol's solution) shows a large number of single muscle-fibers or many still linked together, it is a sign of some pathologic condition of the stomach or intestines. The same is the case with drops of fat, or if single particles of starch (stained blue with Lugol's solution) are found in any amount.

It is self evident that the microscopic and chemical examination of the feces will further have to decide whether there are present any blood, pus, tubercle bacilli, pieces of tissue, mucus, intestinal parasites, etc.

Flatus.—The flatus of the intestinal tract is composed of several gases, which are formed as the result of changes which take place during the digestive process. The gases play an important part during digestion and the passage of the chyme and feces through the small and large intestine, assisting the digested and undigested food on its journey from the duodenum to the rectum by stimulating peristaltic action.

Flatus is present in the intestine in both health and disease, but exists in much larger quantities after meals wherein certain foods, such as peas and beans, have been freely partaken of. Of the gases encountered in the stomach and the small and large intestine under varying circumstances, the following are the best known: Carbonic acid gas, hydrogen, carburetted hydrogen, nitrogen, and sulphuretted hydrogen, which is found only in the intestine.

The flatus is partially disposed of by being taken up by the circulation, partially by being discharged from the body with the feces and during the intervals of defecation, and under certain pathologic conditions the gas of the intestine may escape in small or large quantities by way of the mouth. Flatus and tympanites are common and distressing manifestations of certain diseases of the colon and rectum, such as fissure in ano, stricture, cancer, or other affections with a tendency to narrow or obstruct the lumen of the bowel, and catarrhal conditions of the intestine.

It is highly interesting to watch how the quantity of food and its quality determine the amount of gastric juice. Further, it is noticeable how the amount of gastric juice influences the pancreatic secretion, and how, for instance, a deficiency of bile influences the intestinal peristalsis and the growth of different bacteria.

These highly interesting connections cannot be entered into in detail here. Only those facts may be pointed out which have to be taken into account when dealing with the problem of habitual constipation.

The question is this, How is the digestive process regulated to lead to a regular daily passage? What factors govern the motility of the stomach and intestines?

In regard to swallowing and the passage of the food through the esophagus, there is not much to be said. It must be mentioned, however, that the manner of mastication greatly influences the digestion. The better the food is masticated (Fletcherized), the more mechanical work is done and the easier is absorption and assimilation within the stomach and intestines. Persons who masticate their food unusually well show a tendency to a less frequent and smaller amount of passage because of the thorough absorption which takes place. In the stomach and in the intestine the peristalsis is stimulated mechanically and chemically; mechanically, through the weight of the food and its consistency. Solid food stimulates more strongly than liquid. Gas stimulates through its distending power and has a partly chemical action. CO_2, CH_4, H_2S are strong stimulants. Substances which undergo fermentation easily and the presence of the corresponding bacilli will stimulate peristalsis. All the digestive juices act more or less as chemical stimuli and most of the absorbed substances have the same effect. Any substance of unusually warm or cold temperature will act as a stimulus, hence the common use of a glass of hot or cold water on an empty stomach to provoke a passage. The lower part of the small intestine and the colon receive under normal conditions no solid particles. If, therefore, through a lack of gastric juice (achylia) coarse particles reach the ileum, they will induce this part to a livelier peristalsis. On the other hand, for obvious reasons, a very powerful quality or an abundant amount of gastric juice will lead to a diminished intestinal peristalsis. The more insoluble particles contained in the food, the more frequent the passages. The indigestible cellulose of the vegetables and fruits is very valuable in this respect. Absorption if unusually active diminishes the amount of the intestinal contents and leads to infrequent passages, hence the retardation of the bowels after perspiring. Poor absorption increases the amount of the contents and accelerates passages, hence the diarrheas observed in atrophic conditions of the intestines, liver, Bright's disease, etc.

A good general circulation favors peristalsis, hence the irregular evacuations of those whose bodily exercise is not sufficient.

The more fat in the intestine, the easier it is for its muscles to carry the contents along the lubricated walls; besides this, the fat is split up, especially in the colon, through bacterial action into glycerin and fatty acids, both substances being local stimuli for the intestine. This explains the effect of oil enemata.

Besides the locally acting contents, stimuli arise outside of the intestinal canal which lead to reflectory action upon the bowel motility, such as, for instance, cold feet or short cold applications. It was mentioned above that the automatic peristalsis of the intestines is under the control of nervous centers in the spinal cord and in the brain.

Summing up, it is evident that in health the peristalsis of the digestive tract will lead to the regular elimination of its contents, occurring once in twenty-four hours in the great majority of cases, provided enough food is consumed, this food contains enough residue, and the chemical digestion takes its normal course. Each of these factors is capable of disturbing the normal evacuation of the bowels as soon as it transgresses the physiologic limits. Later on we will have to point out in detail those disturbances which account for impaired motor function of the alimentary canal. The intricate process of digestion, the general outlines of which have thus been briefly sketched, is complicated still further by the relationship and interdependence of its various phases. In order that this task be successfully accomplished, it is essential that the many different components of the digestive tract work together in that beautiful harmony of forces which maintain health and life itself.

DEFECATION

Having pointed out the changes which occur during the passage of the food from the mouth to the sigmoid flexure, and discussed the manner in which it is propelled thus far along its course, it remains now for me to describe the method by which it is discharged from the sigmoid flexure into the rectum, as well as the mechanism by which the non-nutritious or excremental matter is expelled from the body.

The act of defecation is very complicated, and is partly voluntary and partly involuntary. Its beginning and completion are, in the main, under the control of the will, while the intermediary stage is the result of involuntary mechanism.

Its location, length, angulations, attachments, curves, and the narrow ring-like juncture with the rectum all help to make the sigmoid flexure the ideal part of the gut, wherein the feces may accumulate and be retained until the time for defecation arrives. After a sufficient quantity of feces and gas have collected in the sigmoid colon (Nature's storehouse for the excrement), it starts up peristaltic action. As the wormlike movements of the colon become more pronounced, and extend along the colon from above downward, the sigmoid flexure, under normal conditions, is lifted up out of the pelvis and the feces are forced through O'Beirne's sphincter into the rectum.

Up to the time the excreta leave the sigmoid flexure, there is no desire to go to stool, but just as soon as the feces or gas are discharged into the rectum and enter the anal canal, an imperative desire to evacuate the bowel is created. The exact manner in which this peculiar sensation is produced has never been satisfactorily explained, no one has been able to demonstrate clearly what causes it, and it is not known whether it is due to pressure, distention, chemical changes, bacterial action, or to other causes. The writer has treated many cases of constipation in which the desire to empty the bowel was produced by irritating discharges, both slight and profuse, coming from the colon or sigmoid. Again, he has known the sensation to be induced by polyps, hemorrhoids, stricture, foreign bodies, and pressure from tumors, both within and without the bowel. In view of these clinical facts and others which might be mentioned, it would seem that the desire to go to stool is not produced by anything which enters into the composition of the feces and flatus. On the other hand, it is most likely that this indescribable sensation is the result of an irritation of the nerve elements induced by the discharge into the rectum of liquids, solid feces, or gas, which cause more or less pressure in, or distention of, the rectum.

If this warning of the approach of the feces is appreciated and the contents of the rectum are promptly expelled, all is well, but, on the other hand, if the desire to go to stool is ignored day after day, the mucous membrane soon loses its sensitiveness, the muscular coat becomes weakened, and as a result large quantities of fecal matter may accumulate in the rectum without causing any desire at all to evacuate the bowel. The stimulus of this peculiar sensation, however produced, is transmitted to the proper center in the spinal cord by means of the hemorrhoidal and inferior mesenteric plexuses, and is then reflected to the musculature of the rectum through the pudendal plexus, resulting in relaxation of the external sphincter, a contraction of the muscular coat of the bowel, and extrusion of the feces.

In the intervals of defecation the anal sphincter remains in a state of repose or passive contraction. The center which controls the sphincter and, in a large measure, the act of defecation, is situated in the lumbar enlargement of the cord, and may be voluntarily stimulated or in a slight measure inhibited. Destruction or injury to this part of the cord causes a permanent relaxation of the muscle, while a similar condition of affairs if located in the dorsal region induces only a temporary relaxation.

To a certain extent, the sphincter muscle is influenced by a center in the brain, supposedly located in the optic thalamus, and which is usually under the control of the will, but during certain emotions, as rage or sudden terror, the sphincter may become relaxed and an involuntary evacuation of the feces may occur.

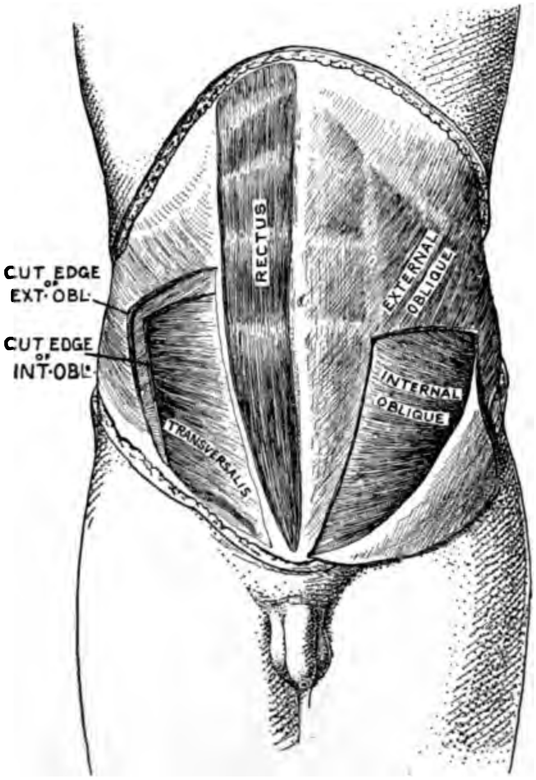

Fig. 16.—Arrangement of the abdominal muscles.

Under ordinary circumstances, by the aid of peristaltic action with the contraction of the muscular layers of the rectum, together with the assistance rendered by the levator ani and sphincter muscles, an evacuation may be quickly secured. When, however, the fecal accumulation is abundant, of large size and very dry, defecation is more difficult, and the abdominal muscles must be pressed into service. In some instances but slight pressure is required, but in others, especially in cases where the feces are composed of less than 50 per cent. of water, great pressure is necessary to dislodge them from the sigmoid. Under such circumstances, in order to complete the act of defecation, it is necessary that the diaphragm should be forced downward, and that the abdominal muscles (Fig. 16) should be drawn inward to their utmost (Bauchpresse), crowding the intestines together, thereby stimulating peristalsis and helping to force the excrement out of the sigmoid and through the rectum.

The importance of abdominal pressure in defecation is easily understood by those familiar with the anatomy of the sigmoid flexure. A large part of the sigmoid remains in the pelvis during its empty state, but as the feces accumulate it rises up to the pelvic brim, and under these circumstances will be found more frequently upon the right than the left side of the median line (Fig. 3). It is hardly necessary to add that certain pathologic conditions and abnormalities, such as intestinal angulation, adhesions, stricture, or diseases which excite spasm of the levator ani and sphincter muscles, are those which tend to diminish peristaltic action and glandular secretion, frequently rendering the evacuation of the bowel difficult in some cases and almost impossible in others.

The mechanism of the act of defecation is as follows: When the proper time for stool has arrived, through a voluntary effort the glottis is closed after an inspiration, the diaphragm is forced downward, and the abdominal muscles (especially the internal oblique) are drawn inward, compressing the viscera and propelling the feces on their downward course. Immediately after their exit from the sigmoid they come in contact with the uppermost Houston valve (Fig. 5), on the left rectal wall, where they may be arrested temporarily, or immediately glide off to fall upon the next valve on the right anterior wall, and from here, in the same manner, they pass to the lowermost valve on the left side, and then to the fixed rectum. This arrangement permits of a sort of rotatory and step-by-step descent of the feces, thus giving the levator ani and sphincter muscles time to prepare for their approach. The feces are pushed toward the anal canal and levatores ani muscles, drawing the anal canal upward and over them. At this point peristalsis and pressure by the abdominal muscles are increased, forcing the feces downward, the sphincter muscle (Fig. 14) voluntarily relaxing to allow of their passage, while the levator ani (Figs. 14, 15) contracts and closes in behind them, thus assisting in the completion of the act of defecation.

Personally, I believe that the strongest factor in the propulsion of the feces through and out of the rectum during defecation is a progressive invagination or rolling downward of the bowel into the rectum, which acts like a piston and drives the feces before it, similar to the act as seen in a horse. This action can be observed by inserting a sigmoidoscope and gradually withdrawing it, as the patient strains as if at stool, when the bowel may be seen closely following the instrument down to the anus.

Writers generally agree that when the desire to empty the bowel is disregarded the sensation may pass away. Because of this, and the fact that by digital examination the rectum in such cases is sometimes found empty, O'Beirne was led to believe that the feces, when not evacuated at the proper time, were returned to the sigmoid hy reverse peristalsis. It has been my experience that in nearly all such cases the rectum does retain a fecal accumulation. I believe, however, that in exceptional cases the feces may be redeposited in the sigmoid colon. To determine this point I have frequently instructed patients not to have a stool, and have examined their rectums at various times during the thirty-six hours following. In most instances digital examination revealed an accumulation of feces in the rectum, but in a few the earlier examinations revealed such a condition, while those made later showed the rectum to be empty. Further evidence of reverse peristalsis are fecal vomiting in cases of obstruction, the removal by laparotomy of foreign bodies introduced into the rectum some days before, and the discharge several days after rectal operations of blood-clots, the presence of which in the rectum previous examination, both digital and per rectoscope, had failed to reveal. Again, the lower rectum may be found empty, but rectoscopic examination will reveal the feces above and supported by the valves. Moreover, if the entire fecal mass is not discharged at stool, the remaining portion is sometimes visible above the valve.

CHAPTER IV

DEFINITION, CLASSIFICATION, AND GENERAL REMARKS ON ETIOLOGY

Definition. Constipation cannot be clearly defined, for the reason that there are not only different kinds, but varying degrees of each type. As generally interpreted, constipation may be described as a *chronic state of the intestine marked by delayed, infrequent, insufficient, or irregular fecal evacuations.* Physiology teaches us that every healthy individual should have a copious well-formed fecal evacuation, weighing about 6 ounces, once in every twenty-four hours. While this rule will hold good in most instances, clinicians know that the daily stool is not essential to good health in some individuals, experience having shown that some patients may have but one evacuation in every two or three days or at even longer intervals, and yet remain apparently well, whereas others may have two or more stools in twenty-four hours and continue in good health.

Classification.—For purposes of clinical study, constipation may be classified as acute and chronic:

Acute constipation is of rare occurrence, manifests itself suddenly, is frequently accompanied by grave local changes in the intestines, such as necrosis, etc., is dangerous, and usually requires prompt surgical interference.

Chronic constipation is more prevalent, develops slowly, and is induced by organic changes, impairment of the general health, or local disease of the bowel.

In this connection, I will call attention to *obstipation* and *fecal impaction.*

Obstipation is the name given to a special variety of constipation brought about as the result of some *mechanical* obstruction to the free passage of the feces through the intestines, as, for example, congenital deformities, stricture, pressure by neighboring organs, tumors, foreign bodies, hypertrophy of the rectal valves, angulation, etc.

By *fecal impaction* is meant a condition marked by the accumulation within the intestine, from whatever cause, of large, hard, semisolid or putty-like oval or nodular (scybala) fecal masses, which resist natural efforts at expulsion.

I will not discuss obstipation and fecal impaction further at this time, for the reason that they represent different phases of costiveness, and will from now on be studied in connection with constipation.

General Remarks on Etiology.—I doubt if there be any other ailment characterized by so many and varied etiologic factors as constipation. Costiveness should not be considered as a disease, but as a manifestation of some disturbance or irregularity in the intestines or in some other part of the body. If this view is accepted, and the proper measures are taken to remove or correct the cause of the delayed or insufficient evacuations, marked improvement or a permanent cure will be accomplished in every instance. This being the case, it is absolutely essential that physicians who treat constipation should have a comprehensive knowledge of the many factors entering into its causation.

During my lectures at the New York Post-Graduate Medical School and elsewhere, I have frequently been asked, "What is the cause of constipation?" and "What is my method of curing it?" I have invariably replied that there is no *one* cause of this condition, and there is no single method of relieving it.

Many practitioners apparently consider that constipation is due to some particular cause and can be cured by a specific treatment. Some attribute the cause to local disease of the rectum and anus, and would relieve it by stretching the sphincter, removing piles, or dividing the rectal valves. Others attribute the costiveness to gastric and intestinal indigestion, reflex nervous disturbances, or atony of the intestine, and prescribe accordingly—medication, massage, or electricity, etc.

It is true that constipation may be induced by any one of the abovenamed and other causes; it is also true that in some instances a cure may be effected by carrying out a particular line of treatment. My experience, however, has convinced me that there is no one cause of constipation and that there is no one method of treatment which is universally successful. In a large majority of this class of sufferers who have come to me for treatment, I have found that the infrequent evacuations were not due to any *one*, but to *several etiologic factors*, which had to be considered in the treatment in order that a cure might be effected. Consequently, I have found it advantageous to give a close study to each ***individual*** case, in order to discover the cause or causes of the trouble.

I will not attempt to discuss in detail all the etiologic factors which are said to induce constipation, for this alone would require a large volume. I will, however, call attention to the most frequent and important among them, in order that their special significance may be understood.

After a brief mention of the etiologic factors in the *acute* form, the causes of the most common and pernicious or *chronic* type of constipation will be discussed in greater detail.

Etiology of Acute Constipation.—The passage of the feces may be suddenly arrested, inducing partial or complete intestinal obstruction. This acute constipation is the result of functional disturbances, interference with the up-and-down motion of the diaphragm (acute diseases of the lungs, etc.), inflammatory exudates (peritonitis, typhoid fever, pelvic inflammation, etc.), local disease in or in close proximity to the small intestine, colon, rectum, or anus, and diseases of the nervous system (acute mania, meningitis, apoplexy, hysteria, etc.), where there is involvement of some center in the brain or cord, or injury to the nerves supplying the gastro-intestinal tract, leading to diminished peristalsis, and weakening or paralysis of the muscles concerned in defecation. Again, it may be induced by acute infectious diseases, affections of the liver (absence of bile in the intestine, gall-stone, etc.), traumatism of the intestine, lead-poisoning, and lack of opportunity or inclination to attend to the hygiene of the bowel.

The most frequent direct causes of acute constipation (obstipation) are: Intussusception, volvulus, angulation, strangulation, tumefactions, adhesions, pressure from neighboring organs or morbid growths, congenital malformations of the intestine, foreign bodies, and enteroptosis. I have elsewhere[1] cited 45 cases of partial and complete obstruction in patients varying in age from eighteen months to seventy-six years. All of these had acute or chronic fecal impaction, induced by a great variety of causes. These cases, together with a large number treated since that time, include nearly all of the known causes of acute constipation. My experience leads me to believe that this complaint is more prevalent than is generally supposed, and, furthermore, that a good prognosis can be made in a very large percentage of these cases when the *cause* of the trouble is promptly discovered and corrected.

Etiology of Constipation in Childhood.—Before dismissing this subject, I wish to call attention to the more important causes of acute constipation in early life.

I regard the great length of the intestine, its long mesentery, and poorly developed musculature as frequent predisposing causes of constipaton of the acute type, for the reasons that the two former favor angulation, encourage invagination, enteroptosis, and volvulus; while the latter is conducive to costiveness, owing to the very poor contracting and expulsive power of the bowel.

Acute obstipation not infrequently results from congenital malformations of the colon, rectum, or anus, where a part of the bowel is missing or terminates in a blind sac, or where there is partial or complete obstruction to its caliber induced by fibrous bands or strictures.

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[1] Gant, *Diseases of Rectum and Anus*, second edition, 1901.

Perhaps the most common causes of costiveness in childhood are ignorance or indifference of parents, who permit their children to eat any and everything they desire, and who make little or no effort to secure for them a daily evacuation.

I have frequently been called upon to treat infants and children for acute constipation, where I have found the rectum, sigmoid flexure, and colon compactly filled with enormous quantities of hardened fecal matter, parched corn, strawberry or blackberry seeds, cherry and persimmon stones, pits, and other indigestible substances, which had been permitted to collect in sufficient quantity to cause obstruction. I have also treated many cases of acute constipation in childhood, complicated by difficult and painful defecation, induced by foreign bodies which had been swallowed, and still other cases where it was due to local conditions of the bowel, such as rectal prolapse, anal stenosis, polyps, fissure, or pathologic conditions giving rise to sphincteric spasm.

CHAPTER V

ETIOLOGY OF CHRONIC CONSTIPATION

THE numerous and manifold factors which enter into the etiology of chronic constipation are very well brought out in the following list of causes:

Predisposing causes:

- (*a*) Heredity.
- (*b*) Sex.
- (*c*) Age.
- (*d*) Occupation and environment.
- (*e*) Upright position.
- (*f*) Chronic invalidism.
- (*g*) Impairment of abdominal muscles.
- (*h*) Atony of intestine.

Determining causes:

- (*a*) Dietetic factors.
- (*b*) Irregularity in attending to stool.
- (*c*) Inconveniently located or improperly constructed water-closets.
- (*d*) Drug and enema habits.
- (*e*) Chemical and medicinal causes.
- (*f*) Colitis, sigmoiditis, proctitis.

Miscellaneous causes. Psychic influences.

Obstructive Causes.—Because of their number and importance, the obstructive causes will be discussed in a separate chapter.

PREDISPOSING CAUSES

Heredity.—Constipation may or may not be the result of heredity. In my opinion this condition in a very large majority of the cases is acquired. Nevertheless, I have treated numerous persons in whom heredity was apparently an important factor in the causation of the costiveness. In such instances I have been able to obtain a history showing that the parents, grandparents, and sometimes great-grandparents and various collateral members of the family had been similarly afflicted.

While it is denied that one can inherit tuberculosis, it is generally admitted that the children of tuberculous parents inherit a predisposition to this disease.

Many of the children of constipated parents suffer from this complaint from infancy, and it does not seem unreasonable to assume that the defect causing the constipation—be it a displaced or deformed bowel, a sluggish liver, a weak intestinal musculature, or glandular inactivity—is transmitted from parent to child.

That the influence of heredity is a strong one, and that habits existing for but a few generations may exert a marked influence upon the individual descendant, is a fact illustrated in the tapestry weavers of France. The beautiful work produced by children whose ancestors for several generations have been tapestry weavers cannot be duplicated by children whose forefathers have been artisans in other lines. Although these children may have had equal training and an equal experience, a certain indefinable dexterity or talent is lacking, and this subtle superiority of the tapestry weaver's child appears to be a matter of heredity.

Certain other factors predisposing to costiveness, although perhaps partly a matter of education, are inherited as a pernicious legacy, perhaps from indifferent or ignorant parents, such as an appetite for foods that constipate, a distaste for healthful and invigorating exercise, or a mental attitude of indifference to proper bowel hygiene.

In conclusion, I would state that in my belief too much stress has been placed upon heredity as a cause of constipation, since in most cases some other cause or causes can be demonstrated upon sufficiently close examination.

Sex.—Women suffer from constipation very much more frequently than do men, and there are many good reasons why this is so. Their mode of living is conducive to constipation because they are more confined to the house, take relatively little outdoor exercise, and must necessarily lead a rather sedentary life. Their manner of dressing, especially tight lacing, has much to do with producing this condition; as the corset prevents the normal development of the abdominal muscles and interferes with their expulsive power. Again, this outside pressure may interfere with the fecal current by producing twists and angulations in the gut, or by forcing the stomach, small and large intestines, and possibly other abdominal organs downward into the lower abdomen and pelvis, not infrequently bringing on enteroptosis.

Many women experience a more or less marked tendency toward constipation in the week preceding the appearance of the menses, and this may be referred either to the premenstrual pelvic congestion or the loss of water in the stools due to the generally increased excretion of urine and perspiration at this period (Robbins).

Pregnancy is an important etiologic factor in producing infrequent evacuations because the gravid uterus presses upon the intestine, producing obstruction to the free passage of the feces, and weakens the abdominal muscles by stretching and separating the muscular fibers, thereby diminishing their expulsive powers during the act of defecation, both during and following pregnancy.

In many cases costiveness may be due either to ovarian, tubal, or uterine disease or inflammation, with their sequelæ, tumefactions and adhesions, resulting in immobility, angulation, or obstruction of the intestine, or the imperfect evacuations may result from pressure or encroachment upon the rectum and sigmoid flexure caused by uterine displacements or tumors; or in certain instances, as Murray has pointed out (*Medical Record*, Aug. 6, 1904), constipation may result from the pouching of the lower bowel and formation of a rectocele.

Another very frequent source of constipation in women is false modesty, or their squeamishness about being seen going to the toilet while in public places, no matter how strong the desire to empty the bowel may be; a practice which must necessarily lead to irregular evacuations. It is said that European women do not suffer so frequently from constipation as their American sisters. This in part may be attributed to the fact that they do not hesitate to go to the water-closet when they have a desire to go to stool, independent of the fact that they may be a member of a party or in some crowded place, as a restaurant or theater.

Age is not infrequently a predisposing cause of constipation. Elderly persons and babies are more prone to costiveness than are older children, young adults, and persons in middle life. The aged are frequent sufferers from this complaint because of their lowered vitality, atrophied musculature, glandular inactivity, poor assimilation, and impaired digestive apparatus; again, because they eat little and take but little exercise, and for the reason that they are frequent sufferers from enlarged prostate and hemorrhoids, which excite sphincteric contraction.

The persistent constipation frequently encountered in infants and young children may in many instances be attributed to anatomic causes, because the great length of the intestine and its mesentery predisposes the bowel to twists, angulations, invagination, and prolapse, thus preventing the proper discharge of the feces; further, because in the very young the longitudinal and circular muscular fibers are poorly developed, the bowel is composed almost wholly of mucous membrane, and consequently there is deficient peristalsis, and the expulsive powers are imperfect.

Again, the insufficient and infrequent evacuations may be induced by congenital displacements of the gut or deformities of the colon, rectum, or anus, accompanied by partial or complete obstruction, induced by fibrous bands, narrowing of the anus, or absence of some part of the intestine, where it terminates in a blind pouch, or opens into the urethra, vagina, or bladder.

I have treated 10 cases of constipation and obstruction caused by congenital defects of the rectum and anus. I have also cared for 6 children suffering from constipation who had been previously operated upon for congenital deformity. In these the artificial anus made was improperly placed, or was too small to permit a normal evacuation.

The natural position of the infant on its back is conducive to constipation, because in that position it is impossible to bring the abdominal muscles into play during defecation.

In many instances costiveness in children is traceable to artificial, irregular, or overfeeding, or to improper foods, especially when there is not sufficient fat, and in bottle-fed children, where the ingredients are not in the proper proportions. In other cases the infrequent stools are the result of carelessness upon the part of the mother, who does not take sufficient pains to secure a regular daily evacuation, but prefers to resort to purgatives and enemata to secure temporary periodic relief; and in so doing encourages irregularity on the part of the bowel. Too much stress cannot be laid upon the necessity of properly educating young children to go to the closet and endeavor to secure a full and complete evacuation at the same hour each day.

Occupation and Environment.—The occupations and surroundings of the individual play a much greater part in the production of constipation than is generally supposed. It is an unquestioned fact that farmers, laborers, gardeners, and others who work hard and in the open air suffer less frequently from constipation than do persons whose occupation involves but little if any manual labor, and keeps them confined within doors, where there is an insufficient amount of oxygen. It may be stated with equal truth that business and professional men who take a liberal amount of recreation, devoting their time to golf, tennis, horseback-riding, rowing, and walking, are less apt to be constipated than others who have the same vocations, but keep steadily at their work from force of circumstances or because they are indifferent to the importance of mental relaxation and active outdoor exercise.

Constipation, for the same reasons, is of noticeably less frequent occurrence among baseball and football players, swimmers, and field and track athletes generally, and among the Germans, nearly all of whom are members of some "Turn Verein."

Attention has already been called to the fact that women are the most frequent sufferers from constipation, the result, in a large measure, of their indoor life and lack of active exercise.

The occupations of conductors, brakemen, firemen, engineers, porters, mail-clerks [1] and motormen predispose to constipation because of the irregular manner of life they lead. It is impossible for such employees to have a regular time for eating, sleeping, and attending to the calls of Nature. It not infrequently happens that men who have just returned tired out from a long or delayed trip, find themselves compelled to take the run of some one who is sick or who has been discharged, without being given time to eat or sleep. The stop for meals at railway stations is usually from fifteen to twenty minutes, and part of this-time is taken up by the respective duties of the train crew, leaving them, as a rule, not more than ten minutes in which to eat. Consequently they run into the dining-room or to the lunch-counter and gulp down in ten minutes a quantity of food that should require at least one-half or three-quarters of an hour if properly eaten; then off they go at the rate of twenty or thirty miles or more an hour. Naturally, then, the improperly masticated food, insufficiently mixed with saliva, is forced into a *seasick* stomach, or one that is being continually rocked from side to side by the swaying motion of the train, interfering with normal digestion.

Another common source of constipation among railway employees is that they defer an action from hour to hour, or from one day to another, sometimes through gross carelessness on their part, and again because their duties will not permit them to take sufficient time to empty the bowel.

Among others whose occupations predispose to constipation may be mentioned paint, metal, chemical, and stone workers.

Upright Position.—The erect position so constantly assumed by man may be put down as one of the predisposing causes of constipation; for the reason that it favors the dropping downward and crowding together of the abdominal viscera, causing enteroptosis, especially in predisposed individuals, which is invariably accompanied by insufficient and infrequent evacuations.

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[1] See "Railroading as an Etiologic Factor in Rectal Disease," Gant, *Diseases of Rectum and Anus*, third edition, chap. xl., 1905.

In this connection I might call attention to the fact that the large veins of the rectum have no valves to support the column of blood, consequently in the upright position these vessels become dilated and weakened, resulting in the formation of hemorrhoids, which favor infrequent evacuations by obstructing the lumen of the bowel and by keeping the lower bowel in an inflamed or irritable condition. Finally, the upright position assumed by man permits the fecal mass, after it has escaped from the sigmoid flexure and passed the rectal valves, to fall down and rest upon the anal muscles, eventually resulting in hypertrophy of the levatores ani and sphincter muscles, with difficult defecation.

Chronic Invalidism.—Chronic invalidism, actual or feigned, is a frequent and indirect cause of constipation. Most persons who have been confined to the house or to their beds for a period covering several months or years, suffer to a greater or less extent from costiveness, irrespective of the disease of which they happen to be the victim, and the same rule applies to individuals who are not really sick, but believe they are or would make others believe it. In such cases infrequent stools are attributable to difficulty in evacuating the bowels while in the recumbent posture assumed by chronic invalids, to insufficient exercise, debility, old age, or in some cases to the drug habit, when opium, morphin, and like agents or astringents have been used for a considerable time. In other cases of chronic invalidism constipation may be the result of inflammatory diseases involving the abdominal or pelvic organs, resulting in tumefactions, flexures, or the matting of the intestines together, or to the other viscera, causing more or less intestinal obstruction and immobility of the bowel. Finally, and not infrequently, costiveness has its origin in mechanical causes, such as scars and adhesions involving the intestine, which are the sequelæ of surgical operations.

Impairment of the Abdominal Muscles.—Anything which tends to diminish the strength of the abdominal muscles may very properly be placed among the etiologic factors of habitual constipation, for the reason that it lessens their expulsive powers and favors the accumulation of the excrement in the colon and sigmoid flexure, which under normal conditions would be expelled.

The effectiveness of the abdominal muscles is frequently diminished as a result of *pregnancy*, because of the injury done to the muscles by the growing uterus, which overstretches the fibers or causes them to separate.

Again, their contracting powers may be lessened in *obesity*, from fatty degeneration of these muscles, or from atony induced by the pressure or the weight of the enormous added load of the pendulous or fatty abdomen.

Finally, the expulsive power of the abdominal muscles may be impaired through atrophy in the aged, by laceration or separation of their fibers from direct injuries, or the trouble may be induced by injury or disease of the centers or the cord, resulting in paresis or paralysis of these muscles and the collapsing of the abdominal wall.

Atony of the Intestine.—The causes of habitual constipation are manifold and varied, and of these the most common and persistent is atony of the gut, complicated sometimes to a greater or less degree with atrophy. This may result from one or more of the following causes: Gourmandizing, eating at irregular hours, indolence, ignorance or indifference to the necessity of a daily evacuation at a given time, lack of active outdoor exercise, the drug or enema habit, dissipation, and chronic invalidism. Sometimes atony is induced by diseases of the brain or cord, accompanied by paralysis of the abdominal muscles, or of the intestinal musculature, or it may follow typhoid fever, cholera, ptomain poisoning, or other infectious diseases of the bowel, which through continuous irritation to the mucosa excite prolonged peristalsis and frequent evacuations, resulting in intestinal fatigue from overwork or repeated distention with gas.

In discussing atony of the intestines, Turck says: "Excessive or prolonged distention will result in exhaustion or fatigue of the muscle coat of the bowel wall. In experiments on dogs prolonged and intermittent distention of the intestine with air results in the production of a toxin of fatigue, which produces atony and dilatation. Antitoxins generated by fatigue toxins are obtained which neutralize the action of the fatigue toxins, which normally occurs during the period of rest. Toxins of fatigue are not dialyzable and remain where formed. Rubbing, massage, and gentle exercise hastens the union of the antitoxin with the toxin, resulting in recovery from fatigue." [1]

Again, atony of the gut may be secondary to operations or to peritonitis, appendicitis, intestinal obstruction, and other acute or chronic inflammatory conditions which give rise to great distention or cause the formation of adhesions and tumefactions, which interfere with the mobility of the intestine by binding it to adjacent structures.

In fact, anything which interferes with the daily exercise of the intestine, dulls the sensibility of the nerve-endings in the mucosa, or prevents a free discharge of the glandular secretion, causes frequent distention of the gut with gas, or induces fatigue, or interferes with defecation by causing spasm of the overworked sphincter and levator ani muscles (fissure, hemorrhoids, etc.), may be placed among the etiologic factors of atony.

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[1] F. B. Turck, "Atony of the Rectum and Colon," *Medical Record*, Oct. 7, 1905.

This unnatural or debilitated state of the bowel may be a primary and independent cause of constipation; but in the vast majority of cases it is secondary, and the result of other etiologic factors in the causation of costiveness, which gradually lead up to this condition. Once present, however, intestinal atony can of its own accord cause insufficient and infrequent evacuations, independently or as the persistent cause of costiveness, after the things that produced this weakened and lethargic state of the bowel have been corrected or removed.

Atony favors constipation because in this condition glandular function is impaired, the muscular fibers have become weakened, and their contractile power is diminished. The muscular tone is lost, so that when the bowel is distended with gas it cannot properly contract to expel the flatus, and remains in a state of dilatation. The bowel is now improperly lubricated, its muscular wall is flaccid, and there is not sufficient force to drive the feces at a normal rate of progression in their downward course toward the rectum.

DETERMINING CAUSES

Dietetic Factors.—When the food is partaken of slowly, in proper amounts, at regular times, under cheerful surroundings, and is well masticated, normal digestion may be expected to follow.

Unfortunately, the American people are so fully absorbed in their business and social affairs that they have but little time to spare for anything else; hence, they pay very little attention to their meals, and many eat any and everything, at any and all times of the day and night, and as a result are frequent sufferers from chronic constipation and other evil consequences of dietetic indiscretions.

Clerks, working people, business men, railroad conductors, firemen, brakemen, engineers, porters, mail-clerks, motormen, and others, whose employment is such as to prevent them from having *sufficient time* in which to partake of their meals, are frequent sufferers from chronic costiveness. Under the circumstances, the poorly masticated masses of food, insufficiently mixed with saliva, are hurried into the stomach and small intestine, which are unable to properly digest them. If this occurred but once, no evil consequences might follow; but when repeated day after day, year in and year out, sooner or later it results in indigestion and atony of the intestine, which with its accompanying weakened musculature and deficient lubrication from scanty glandular secretion, makes it difficult for the feces to be propelled through the intestinal tract.

Gourmandizing or overeating produces this complaint in much the same way. It matters not whether this occurs in individuals who have a ravenous appetite, or in those who have formed the habit of eating too many meals, or whose social duties are such as to require them to attend luncheons, dinner parties, and after-theater suppers, where in order not to appear impolite they eat much more than they really want or need.

Overfeeding not only causes an overloading of the intestine with indigestible matter favoring fecal impaction, but overtaxes the digestive capacity of the bowel and gives it no time to rest. As a result, it becomes sluggish and the normal evacuations are less frequent.

Constipation may be secondary to dietetic errors where the food consumed contains too little water, insufficient fat, or not enough cellulose. Persons who partake largely of vegetables containing cellulose are prone to have more normal evacuations than those living principally upon a meat diet, for the reason that the former tends to excite a more healthy peristalsis than does the latter; and further, because the feces are softer and more easily moved along the intestinal tract, owing to the larger amount of water in this than in the nitrogenous dietary.

On the other hand, constipation may follow a diet consisting entirely of vegetables, because of the large amount of residue which remains. I have elsewhere called attention to the frequent occurrence of oat-stones (avenoliths) and potato-husk concretions during famine times in Scotland and Ireland. At this time the people had almost nothing to eat except oats and potatoes, and there was such a large dry residue left from this diet that fecal impaction ensued.

From what has already been said, it may be inferred that a mixed diet of vegetables and meat is more conducive to normal evacuations than is a dietary consisting of either one alone.

Patients and others who take too little food or take it in a concentrated form are frequent sufferers from constipation, for the reason that the residue left is insufficient to properly stimulate glandular and muscular activity. For the same reason as that just mentioned, constipation is a frequent accompaniment of starvation and malnutrition, no matter whether it is the result of a stricture or tumor of the esophagus, stomach, or upper part of the small intestine, or referable to a rigid diet or other causes.

In conclusion, it remains to be pointed out that constipation may also befall persons who do not consume sufficient water to keep the feces softened and permit of their easy passage along the intestinal tract.

In the chapter on Physiology of the Bowel I have already called attention to the fact that the stools under ordinary circumstances are composed of 75 per cent. water and 25 per cent. solids. When the proportion of water falls below 50 per cent., the feces become decidedly more compact and difficult to transport along the intestinal tract, and when the stools contain a still smaller amount of water (20 to 30 per cent.), they tend to form scybala, which collect in sacculations of the colon and are extremely difficult to expel.

Irregular Hours for Evacuating the Bowels.—Ignorance or indifference as to the necessity of having a regular time to empty the intestine, false modesty, inconveniently located closets or privies, preoccupation of the mind, certain avocations, social engagements, invalidism, and any and everything which from day to day postpones or prevents the emptying of the bowel immediately upon the desire to evacuate it, thus leading to irregularities in the time for going to stool, may be classed among the etiologic factors of constipation.

The healthy individual under normal circumstances should have one copious action each day. The most natural and favorable time to defecate is shortly after breakfast, for the reason that the excrement has accumulated in the colon during the night, and the morning meal serves to stimulate and start up peristaltic action, which ultimately leads to defecation.

When the usual amount of food is partaken of at customary hours and there is nothing to interfere with the fecal current, the intestinal contents will be propelled through the alimentary tract with the normal rapidity, and a regular evacuation should occur at or near the same time each day.

This being the case, there is no reason why persons in reasonably good health should not have a regular time for evacuating the bowel. In fact, most people who have given this subject proper attention, or who have been taught from childhood the importance of securing the daily stool at a certain hour, usually succeed in doing so, and consequently they do not suffer from constipation. Persons who are ignorant or indifferent to the importance of attending to the bowel in this way, have no regular time for going to the closet; for the reason that the bowel has gotten into the bad habit of waiting the convenience of the individual or for the stimulating effects of some artificial means to rouse it to action.

There is something which takes place in the bowel which excites peristalsis and produces a feeling of desire to go to stool. Up to the present it has not been determined whether this sensation is induced by the pressure of the fecal contents, stimulation by gases, distention, chemical changes, bacterial action, or other causes. It matters not what produces the inclination to empty the bowel, but it does make a great deal of difference whether this warning is heeded or not. Where the impression is received and promptly acted upon from day to day, all is well; the bowel remains in a normal condition and regular evacuations occur. If, on the other hand, Nature's warning is habitually ignored and the patient postpones defecation to suit his convenience, the retained feces become hard, produce traumatism to the gut, and serve to obtund the mucosa. When this neglect of the bowel is persisted in for a considerable time, it invariably gives rise to obstinate or chronic constipation because it leads to atony, and as a result large quantities of feces may accumulate, and in some instances remain for days or weeks, without exciting peristaltic action or producing the slightest desire to evacuate the bowel.

Reading at stool is a pernicious habit and a common source of constipation because it diverts the mind and interferes with defecation; further, because it favors the formation of hemorrhoids and other local disease of the bowel, owing to the straining and unnecessary amount of time spent at stool.

Inconveniently Located and Improperly Constructed Water-closets and Privies.—Habitual constipation may in many cases be traced to improperly placed and poorly constructed water-closets and privies. It not infrequently happens in dwellings, stores, apartments, shops, and especially in public charitable institutions, that the toilets are not sufficient in number to meet the demands upon them, or that they are situated in some out-of-the-way or inconvenient place, or are uncomfortable or poorly lighted and ventilated. All these inconveniences tend to encourage chronic constipation, because persons who are compelled to use such closets and privies do so only under the most urgent needs, and at other times they choose to defer evacuating the bowels as long as possible rather than submit to these discomforts, or the inconvenience of going to the toilet when it is on another floor, or is situated at a considerable distance from their rooms or their work.

In small towns and in the farming districts there are few water-closets, but many privies, and the latter for hygienic reasons are usually located at a considerable distance from the house or place of business. They usually have uncomfortable seats and are so poorly constructed that they admit the rain in summer and the snow in winter. Consequently the members of the family very often postpone emptying the bowels when this should be done because of inclement weather or the inconvenience of going to the toilet during the night; or, again, because they are afraid of some one seeing them going in or coming out of the privy. This irregularity soon leads to habitual constipation and the resorting to artificial means to secure the necessary evacuations.

The seats in many water-closets and privies are so high that the feet barely touch the floor. This interferes with defecation because it forces the occupant to sit erect, in which position it is impossible to exert the same amount of abdominal pressure as when on a lower seat and leaning forward. The squatting posture assumed during defecation by persons living in sparsely settled and uncivilized countries is the most natural and effective position one can take during stool, because in this position the full expulsive powers of the abdominal muscles are brought into play. This, together with the pressure of the front of the thighs against the abdomen, serves to stimulate a healthy peristalsis and to press the feces along the colon and out of the sigmoid flexure into the rectum.

Drug and Enema Habit.—In my opinion one of the most common sources of constipation in this country is the pernicious habit of resorting to the use of *drugs* to secure a daily stool. From a study of the patients coming under my observation it appears to me that the American people in this, as in many other things, desire *quick action*, and prefer purgation and prompt relief to other means of securing the desired evacuation, which, though slower, cause less harm and go further toward effecting a cure.

If we except England, there is no other country in which chronic costiveness is so prevalent as it is here; and it is equally true that in no other land do the people so frequently resort to the indiscriminate and senseless use of medicines in order to move the bowels.

In the United States it seems to be the custom for anybody to prescribe any and everything known to produce an evacuation for everybody else, whether they are old friends or entire strangers. In the wash-room of the Pullman car one not infrequently hears one passenger ask another, whom he has met for the first time, if he will not have a cigar; another invites him to a drink of whisky from his pocket flask; while a third will offer him a glass of aperient mineral water, or some pill or powder which he himself is taking, and which he says is fine for the bowels.

It is claimed, and properly so by authorities on constipation, that this condition is of less frequent occurrence in Germany, France, and other parts of the Continent than it is in our own country. The freedom from constipation in these countries, I believe, is largely due to the laws governing the selling of drugs, which are so stringent on the Continent that it makes it well-nigh impossible for a person to procure medicines of whatever kind without having a prescription from a licensed physician. As a result of this foresight, the druggist is prohibited from suggesting to the constipationist his *sure-cure* stock preparation, and the patient is prevented from securing some renowned patent nostrum, or so-called household remedy, which is tempting because it is supposed not to cause him any *pain or inconvenience and works while he sleeps.* His attention has been called to this marvel by seeing it alluringly advertised upon some public building, in a church publication, a magazine, or the daily newspaper.

In every community are to be found families whose forefathers for generations have been in the habit of taking medicines for constipation. This evil habit has come down to each succeeding generation, because the children have become habitués of these drugs as the result of following their parents' example, or because they have been forced to take laxatives and purgatives in order to move the bowels from the time of their earliest recollection. It is a lamentable fact that not a few parents have the insane idea that if they do not administer a cathartic frequently to their children and keep the bowels freely open that dire results will follow; and in their anxiety they eventually bring about or aggravate the very condition which they wish to avoid, namely, constipation.

The drug habit favors constipation by educating the patient to depend upon his daily medicine and not upon any efforts of his own to secure an evacuation; and the bowel remains in an inactive state until peristalsis is excited by the pill, powder, or mineral water which has been taken. This daily dose of medicine overstimulates the bowel, producing a greater activity than is normal, and, according to Nature's rule, a period of rest and recuperation must follow. This period is construed by the patient as an aggravation of his constipation, and he follows with a larger dose, which again overstimulates and gives rise to the resting period. These increasing doses and overstimulation irritate the bowel and excite an inflammatory or catarrhal process of the intestine. Thus it becomes constantly more difficult to obtain a stool because atony sets in, with its consequent glandular inactivity and muscular inefficiency, or a state of hyperirritability and spastic contraction of the large intestine, especially of the sigmoid flexure, is set up. When the overstimulation through drugs has reached the spastic state, cathartics and purgatives may be followed by copious evacuation, preceded by cramps, or an insufficient pencil-shaped mucus-coated stool subsequent to an attack of griping pain; in other cases the patient complains of prolonged colicky pains, while there is absolutely no evacuation from the bowel.

Enemata are of great assistance in properly selected cases in helping to tone up the intestine and to empty the bowel of feces, where they are hard, nodular, or have collected in such quantities that they cannot be expelled without artificial aid. Injections are very often indispensable in this class of cases, when it is necessary to secure an immediate evacuation.

The fact that a bowel movement can be secured by most persons at any desired time, and with but little inconvenience to themselves, by an enema, not infrequently leads persons suffering from chronic constipation to resort to this means of securing the daily evacuation.

The habit of resorting to bowel irrigations (so-called Hall treatment) is very easily formed, and is more prevalent than is generally supposed. I am willing to admit the value of the enema for the purposes mentioned above, but I am decidedly opposed to this method of securing an evacuation at other times.

This common and pernicious habit eventually leads to chronic constipation of the very worst type. The majority of individuals who depend upon this method of relieving the bowel have no idea as to the length and capacity of the intestine or of the amount of water necessary to stimulate peristalsis and wash out the feces. Consequently, they not infrequently inject from 2 to 4 or even 6 quarts of water, when ½ or 1 pint would have proved equally effective.

This overloading of the gut with water would do no harm if it were resorted to at rare intervals, but when it becomes a matter of daily routine its effects are very injurious, owing to the fact that it leads to enteroptosis, angulation, dilatation, atony of the gut, and an obtunded condition of the mucosa.

Chemical and Medicinal Causes.—Certain chemicals and medicines which gain entrance into the body by way of the mouth, the rectum, or through the skin, may be placed among the etiologic factors of constipation. Astringents, such as copper, alum, iron, lime-salts, etc., occasionally are present in the food or drinking-water in quantities sufficient to lessen the intestinal evacuations. Painters and workmen who handle lead and bismuth may inhale or absorb through the skin a sufficient amount of these chemicals to produce the same effect. In most cases of constipation, however, resulting from chemicals and medicines, costiveness is induced by drugs administered for the relief or cure of disease. In fact, all chemicals or medicines which deaden the nerve-centers, diminish secretions, or produce a lethargic state of the muscles, or which have an astringent effect upon the intestine, are fruitful sources of constipation. I have on two occasions found the bowel completely blocked at the junction of the sigmoid and rectum by large dark-colored masses, composed principally of subnitrate of bismuth, which the patient had been taking continuously for a long time for the relief of some gastro-intestinal ailment.

Miscellaneous Causes (General Diseases).—Affections of the lung and diseases of the diaphragm, such as pleurisy, pneumonia, and tuberculosis, which interfere with respiration or the movements of the diaphragm, may be complicated by constipation. From my own observation and a study of the literature, I am convinced that the up-and-down motion of the diaphragm does much toward accelerating the fecal current. Its movements, transmitted directly or through the liver and stomach to the transverse colon, keep up a constant churning motion, which serves to stimulate peristaltic action and glandular secretion and helps to propel the feces in their downward course through the intestine.

Disorders of the liver, such as enlargement, tumors, hardening, etc., or foreign bodies, or disease of the bile-ducts, may be placed among the causes of constipation. In fact, anything which diminishes the supply of bile or prevents its entrance into the intestinal canal tends to produce costiveness; because the bile not only has a powerful influence in stimulating peristaltic action but also adds to the fluidity of the bowel contents, making it more easy for them to be moved along the intestinal tract.

In rare instances diseases of the heart and arteries may be said to be a cause of constipation, for the reason that certain organs of the body are impoverished owing to their limited blood-supply, and, further, because ailments of the heart not infrequently induce diminished oxygenation.

Constipation may result from rheumatism, especially in the rare cases involving the abdominal muscles. It may also be caused by fevers and other exhausting diseases, which lessen the percentage of water in the intestinal contents, through absorption, when the supply of water finds another outlet, as in diuresis, diaphoresis, ascites, and general anasarca.

Colitis, Sigmoiditis, and Proctitis (Perisigmoiditis).—Any one of these conditions may induce or aggravate chronic constipation, because when persistent they lead to a thickening of the muscular coats of the intestine and diminish its power of contraction.

Catarrhal inflammation of the bowel is frequently accompanied by pericolitis and perisigmoiditis, which may result in a circumscribed peritonitis, abscess, or the formation of extensive adhesions, all of which tend to impair the function of the bowel by pressing upon, angulating, or limiting its mobility.

Inflammatory disease of the mucosa is a much more frequent complication of constipation than is generally believed, and when present adds materially to the difficulty in relieving the constipated state, because the measures taken to increase the frequency of the stools often tend to aggravate the colitis, sigmoiditis, or proctitis.

Patients afflicted with mucous colitis invariably suffer from obstinate constipation superinduced by enterospasm (spastic constipation), the outgrowth of the persistent irritation of the bowel.

Psychic Influences.—I have already called attention to the well-known fact that anger, great joy, grief, and fright seriously interfere with digestion. If the nervous centers of the digestive system can be so profoundly impressed by passion and violent emotions, it does not seem unreasonable to expect that a beneficial influence can be exerted upon the nervous mechanism controlling defecation if the mind be concentrated daily at a given time in an endeavor to secure the coveted evacuation. To illustrate the influence of the mind upon the act of defecation, I might repeat the story of a physician at one time under my treatment: "Under normal conditions, it has been my custom to have an evacuation immediately after breakfast. Some time ago I suffered from a fissure, accompanied by great pain and suffering during and following defecation, especially when the fecal mass was large and hard. In order to lessen my suffering, I decided it was better to have two evacuations daily instead of one. There was no trouble in securing the first after the morning meal without the aid of a laxative; but the *second* action, which I desired to have before retiring, was more difficult to secure because the bowels were not accustomed to move at this time. For the first few days I had no desire to stool when I entered the toilet, but by concentrating my mind on the endeavor to bring about an evacuation I succeeded in stimulating peristaltic action, so that the sensation to empty the bowel became urgent and the feces were expelled.

"After some days or weeks I observed that the stools were obtained with less effort and it was necessary to concentrate the mind but a very short period, while formerly a considerable time was required before the desired results were obtained.

"I have noticed the beneficial influence of the mind upon the act of defecation in other ways, as, for example, when in order to keep an engagement I have postponed going to the toilet, though I had a most urgent desire to empty the bowel. My mind being taken up with other things, this desire would soon pass away. Hours afterward I would suddenly remember that I had not had the usual evacuation and I would hurry to the closet, although there was no sensation of feces in the rectum, ready to be expelled. After concentrating the mind in a determined effort to secure the desired evacuation, I have, with few exceptions, been able to stimulate the nervous mechanism sufficiently to bring about defecation."

In treating patients suffering from habitual constipation it has occurred time and time again that after giving them some insignificant application or treatment, to suggest that their visit to the toilet on the following morning immediately after breakfast would result in a satisfactory movement, has proved a true prophecy.

The large number of undoubted cures from chronic constipation which have been made by Christian Science healers goes far to substantiate what I have already intimated in regard to the powerful influence of the mind in controlling the bowel movements.

With this knowledge of the subject, one can understand how careless inattention to the daily stool and a neglect of making use of the helpful influences of the mind, in keeping the bowels regular, may become a factor in producing constipation.

CHAPTER VI

MECHANICAL (OBSTRUCTIVE OR SURGICAL) CAUSES

Congenital Deformities and Displacements of the Intestine. Extra-intestinal Pressure. Strictures. Malignant and Non-malignant Neoplasms. Foreign Bodies.

It is the custom of most writers upon constipation to lay great stress upon improper hygiene of the bowel, indolent habits, digestive disorders, and certain systemic disturbances, etc., as etiologic factors in chronic constipation; while they omit or barely mention the *obstructive* causes of this complaint.

I regard this as a serious mistake, since many of my patients frequently suffer not only from the better-known causes mentioned above, but from mechanical causes as well; and in such cases, no matter how much time is spent in endeavoring to educate the patient and improve his general condition, it is impossible to secure the desired daily stool until the obstruction is removed. In this class of cases it is necessary in most instances to resort to some operative procedure, and for this reason it has been my custom to classify and designate these etiologic factors as mechanical, obstructive, or surgical causes of constipation.

Certainly all surgeons of a large experience must have observed the rapid and marked improvement in patients suffering from chronic constipation following the breaking up of abdominal and pelvic adhesions, the performing of colopexy in cases of enteroptosis, the dividing of the rectal valves, and the severing of the sphincter and levator ani muscles when hypertrophied.

There are many different mechanical causes of constipation; some of which *continually* obstruct the fecal current, while others do so only at intervals, producing *intermittent* constipation.

Congenital deformities, strictures, displaced organs, and pathologic changes of whatever kind, within or without the bowel, which directly or indirectly induce an occlusion or a diminution in the caliber of the intestine of sufficient gravity to act as an obstruction to the free passage of the feces, may, from a clinical point of view, be placed among the *mechanical* causes of constipation.

The delayed and insufficient evacuation, in this class of cases, is not due to a change in the amount or composition of the feces or to general disturbances, but results from something which induces a partial or complete intestinal obstruction. Consequently, this type of costiveness should be diagnosed as *obstipation* rather than *constipation*.

Of the mechanical causes which have been known to produce chronic obstipation and constipation, the following are the most frequent and important:

1. Congenital deformities and displacements of the intestine.
2. Extra-intestinal pressure.
3. Strictures.
4. Malignant and non-malignant neoplasms.
5. Foreign bodies.
6. Intestinal calculi (enteroliths).
7. Fecal impaction.
8. Adhesions and tumefactions (exudates).
9. Angulations (flexures).
10. Diverticula and rectocele.
11. Abnormal mesentery.
12. Volvulus.
13. Hernia.
14. Invagination (intussusception) and prolapse.
15. Splanchnoptosis and enteroptosis.
16. Paralytic ileus.
17. Dilatation of the intestine.
18. Enterospasm.
19. Obstruction by intestinal parasites.
20. Hypertrophy of O'Beirne's sphincter.
21. Hypertrophy of the rectal valves.
22. Hypertrophy of the levator ani.
23. Hypertrophy of the sphincter ani.
24. Deviated coccyx.
25. Diseases of the rectum and anus (hemorrhoids, fissure).

Congenital Deformities.—The intestine, like all other parts of the body, may be the seat of congenital deformities. Congenital defects of the bowel are encountered more frequently in males than in females, and are met with far oftener in the rectum and at the anus than in the other parts of the intestine; in fact, it has been estimated that in every 10,000 births there will occur 1 deformity in this region. These malformations are due to imperfect or arrested development of this part of the gut during fetal life.

The following are the most common types of congenital deformities of the terminal colon, which have been known to induce acute and chronic constipation: (*a*) Congenital narrowing of the anus (Fig. 17).

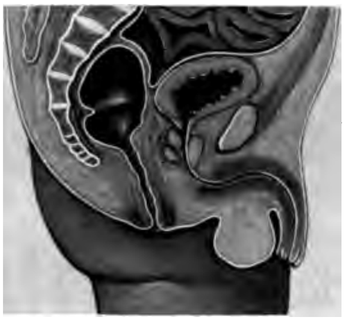

Fig. 17.—Congenital narrowing of the anus and rectum.

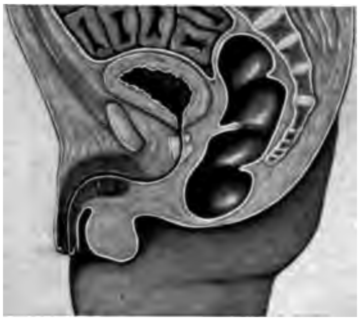

Fig. 18.—Closure of the anus by fibrous connective tissue (membranous obstruction).

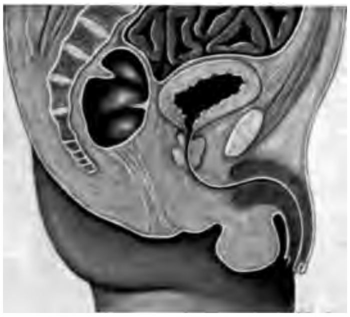

Fig. 19.—Imperforate anus, the rectum ending in a blind pouch.

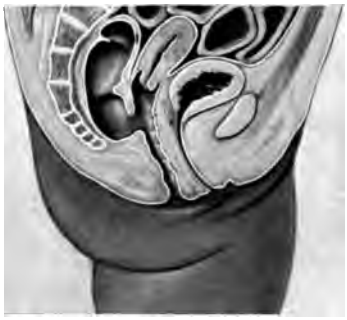

Fig. 20.—Imperforate anus, the rectum opening into the vagina.

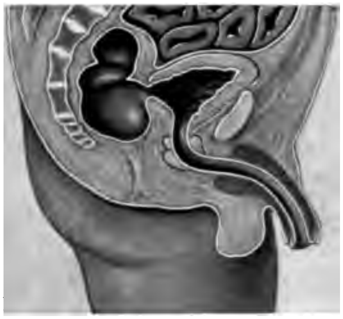

Fig. 21.—Imperforate anus, the rectum terminating in the bladder.

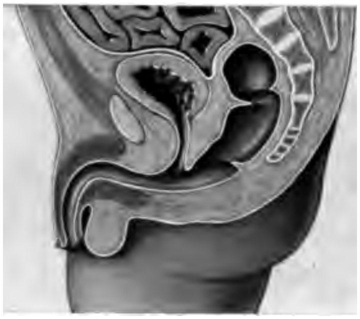

Fig. 22.—Imperforate anus, the rectum terminating in the urethra.

(*b*) Closure of the anus by membranous tissue (Fig. 18). (*c*) Absence of the anus where the rectum ends in a blind pouch (Fig. 19). (*d*) Imperforate anus with fecal fistula, opening into the vagina (Fig. 20), bladder (Fig. 21), or urethra (Fig. 22), or upon the surface of the body (Fig. 23). (*e*) Imperforate rectum with anus in the normal position (Fig. 24). (*f*) Extensive obliteration or total absence of the rectum.

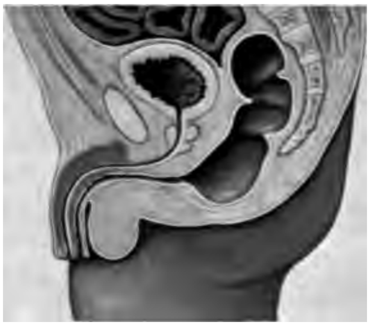

Fig. 23.—Imperforate anus, the rectum opening upon the surface through the glans penis.

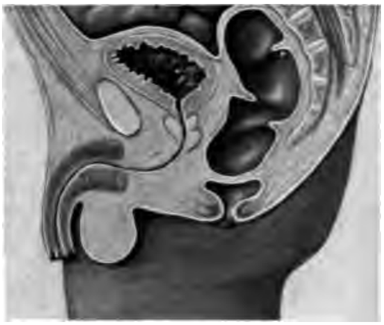

Fig. 24.—Imperforate rectum, the anus natural, but the rectum is obstructed some distance above it by a membranous partition.

Below I have tabulated[1] 8 cases of congenital malformation of the rectum and anus treated by me, which embrace most of the types referred to above. The majority of these little patients suffered from acute constipation, requiring immediate operation. In the others there were infrequent and incomplete evacuations caused by a partial closure of some part of the bowel.

Synopsis of 8 Cases of Congenital Malformation of the Rectum and Anus Treated by the Author:

No.	Sex.	Age.	Variety of deformity.	Treatment.	Result.
1	Male.	36 hrs.	Anus occluded by membranous tissue.	Membrane incised and anu dilated with finger.	**Recovery.**
2	Female.	22 yrs.	Natural anus. Imperforate rectum opening into vagina, through which all feces had been voided during life.	Rectal end of fistula freed from vaginal wall by elliptic incision. The end of the rectum was then reached by another deep incision, opened, brought down, and sutured to the normal anal site.	**Recovery; partial incontinence.**
3	Male.	2 days.	Rectum ended in pouch 3 inches (3.82 cm.) above the anus. Fistulous communication between it and the bladder.	All efforts to reach the rectum and bring it down were fruitless; left iliac colostomy was performed.	**Death five hours later.**
4	Male.	24 hrs.	Anal aperture partially covered by skin.	Integument cut away and anus divulsed.	**Recovery.**

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[1] Gant, *Diseases of Rectum and Anus*, third edition, p. 82.

No.	Sex.	Age.	Nature of deformity.	Treatment.	Result.
[illegible]	Female.	[illegible] days.	Imperforate [illegible] anus [illegible].	[illegible]	Death in few hours.
[illegible]	Male.	[illegible] weeks.	[illegible]	[illegible]	[illegible]
[illegible]	Female.	[illegible] days.	[illegible]	[illegible]	[illegible]
[illegible]	Male.	[illegible] days.	Imperforate anus [illegible]	[illegible]	[illegible]

I have also treated a number of [illegible] chronic constipation who had been previously operated [illegible] congenital deformities of the bowel. The [illegible] procedures was due in some instances to the [illegible] of the opening made to give vent to the feces, while in others it was the result of cicatricial tissue causing stricture in the rectum or at the anus.

It is hardly necessary to mention the fact that most cases of malformation completely obstruct the intestine and terminate fatally within a few days from birth, unless egress is given to the meconium and feces; some, however, have been known to remain in comparative comfort for several weeks without any action, and it is on record that in one instance ([illegible] case, [illegible]) a child has lived for more than three months without discharging anything from the bowels.

Extra-intestinal Pressure.—Chronic constipation is [illegible] caused by extra-intestinal pressure and [illegible] from compression of the small intestine [illegible] inflammatory diseases of the liver, stomach, mesentery, [illegible] tures situated within the abdomen. More frequently [illegible] class of cases, costiveness is the result [illegible] flexure and rectum by tumors [illegible] disease originating in the [illegible] prostate (Fig. 26), or by [illegible] diseases of these organs. In still other cases the pressure [illegible] bowel is caused by ascites, thickened omentum, enlarged glands, or by a displaced uterus (Fig. 27), which may or may not be bound down by adhesions; and in rare instances the obstruction to the intestine is caused by sacrococcygeal neoplasms (Fig. 68).

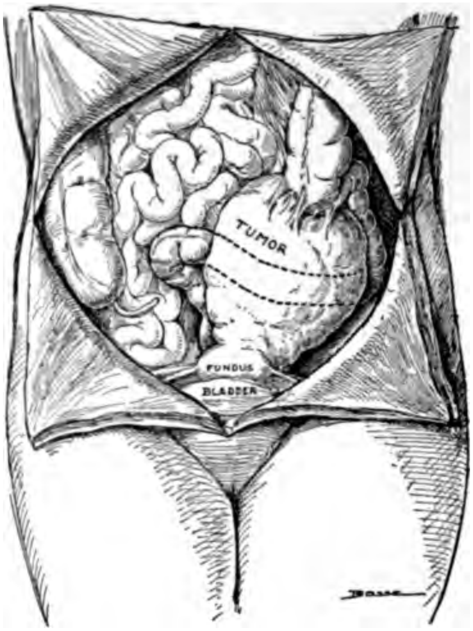

Fig. 25.—Showing compression of the descending colon and sigmoid flexure induced by uterine tumor (case observed by the author).

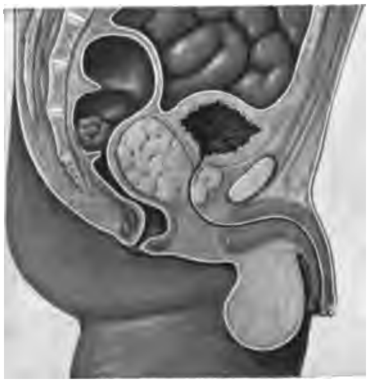

Fig. 26.—Obstipation produced by enlarged prostate.

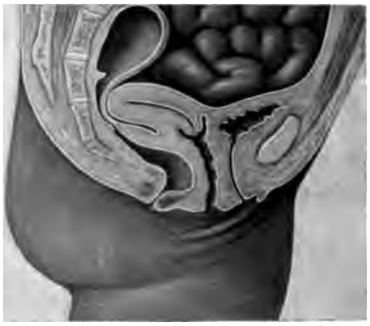

Fig. 27.—Rectal obstruction produced by a retroverted uterus.

Stricture.—Constipation may be caused by stricture or narrowing of any part of the alimentary canal which is of sufficient magnitude to interfere with the passage of the food through it (Fig. 28). It is encountered more frequently in women than men, and in middle life and old age oftener than in the young, if congenital deformities in the latter be excluded.

Strictures inducing costiveness may be single (Fig. 29) or multiple (Fig. 30), and are met with far more frequently in the large bowel, especially the sigmoid and rectum, than in the small intestine or stomach. They are also more prevalent among the colored than the white race, because of the tuberculous tendency of the former and the greater frequency of syphilis among them.

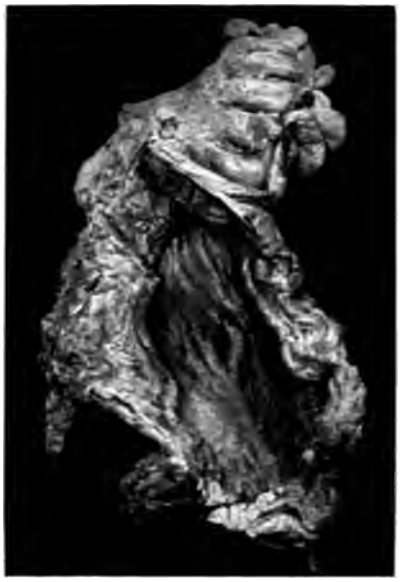

Fig. 28.—Stricture of the rectum due to chronic proliferating stenosing proctitis. Note thickening of rectal wall. (Author's specimen.)

From an etiologic standpoint, strictures may be classified into congenital and acquired. Of the latter, the usual types are as follows: Malignant, traumatic, venereal (syphilitic, chancroidal, gonorrheal), catarrhal, tubercular, dysenteric, varicose (from hemorrhoidal ulceration), valvular, spasmodic, and from extra-intestinal pressure.

I have given the pathology and differential diagnosis of the various types of stricture elsewhere,[1] and for this reason they will not be further discussed. I wish to assume, therefore, that the cause of stricture has already been determined, because for present purposes I am not so much interested in the different pathologic changes resulting in stricture, as I am in the manner in which an existing stricture produces constipation and the methods by which it can be diagnosed and relieved.

Ordinarily in cases of stricture of the intestine the mucous membrane is inflamed, swollen, and ulcerated, and the other tunics of the bowel, above, below, and at the point of constriction, will be found to be thickened and rigid, as the result of a chronic inflammatory process and the formation of an abundance of connective tissue.

In addition, adhesions may form between this and other parts of the gut or neighboring organs, which lessen the mobility and sometimes

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[1] Gant, *Diseases of Rectum and Anus*, third edition, chap. xxiv.

cause an angulation of the bowel. The conditions alluded to above, together with the constriction, predispose the patient to constipation, for the reasons that normal peristalsis is interrupted, there is an absence of glandular secretion owing to the diseased state of the mucosa, and further, because the stricture acts as a direct obstruction to the propulsion of the feces through the involved segment of the intestine.

The formation of benign stricture is *insidious*. In its incipiency patients suffering from this complaint give a history of being slightly constipated at irregular intervals; but as the caliber of the bowel is gradually diminished the costiveness becomes more marked, and cathartics and enemata are absolutely necessary in order to secure a daily evacuation.

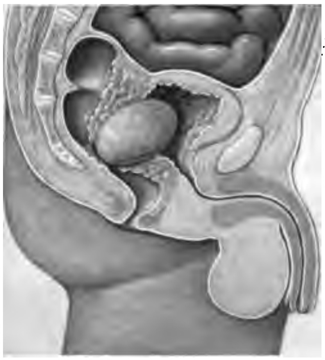

Fig. 29.—Stricture of the rectum produced by a large urinary calculus (Fig. 36) which ulcerated through the rectovesical septum (author's case).

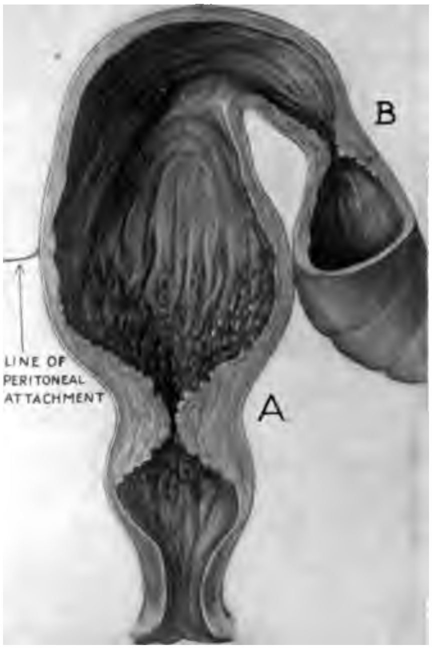

Fig. 30.—Multiple stricture: A, In rectal ampulla; B, in sigmoid flexure.

In the later stages, when the lumen of the gut is almost occluded, these patients suffer from alternating attacks of constipation and diarrhea; and in very bad cases impaction occurs and the colon may be almost completely filled with backed-up feces, irrespective of the fact that the patient is having numerous fluid passages, which escape through or around the impacted mass.

In conclusion, I would state that stricture of the intestine should be suspected and diligently searched for in all persons seeking relief from constipation and giving a history similar to the above, who complain of indigestion, tympanites, straining at stool, and a sensation as if the bowel never completely emptied itself.

I have on several occasions treated patients suffering from progressive obstinate chronic constipation induced by a contraction of several inches of the colon and sigmoid. The musculature was pale and appeared to have undergone a fibrous degeneration. In this class of cases the delayed stools were caused by a narrowing of the lumen of the bowel and a diminution of its mobility and propelling power. There was an inconsiderable amount of scar tissue, but a marked hardening of the bowel wall and thickening of the mucosa. The patient, as a rule, gave a history of colitis, erosions of the mucosa, or recurrent coprostasis, which kept the bowel in a state of constant irritation. Once present, this condition becomes permanent, which helps to distinguish it from the temporary contraction and narrowing of the bowel characteristic of constipation resulting from enterospasm. This peculiar condition of chronic narrowing of a segment of the bowel has been studied through the sigmoidoscope, by exploratory incision, and by post-mortem examination; it differs apparently from intestinal atony and atrophy, and is the sequel of a chronic inflammatory condition of the gut, from what-

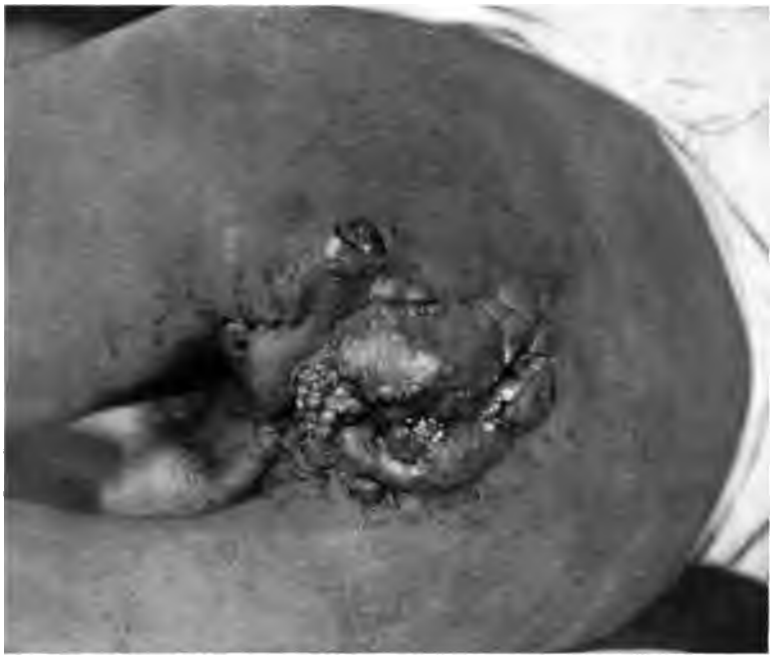

Fig. 31.—Fibrosarcoma with multiple fistulæ, involving the rectum and anus (author's case).

ever cause. Hamilton observed in constipated subjects a narrowing of the sigmoid of a similar nature, which he attributes to round-cell infiltration, consequent upon protracted irritation.

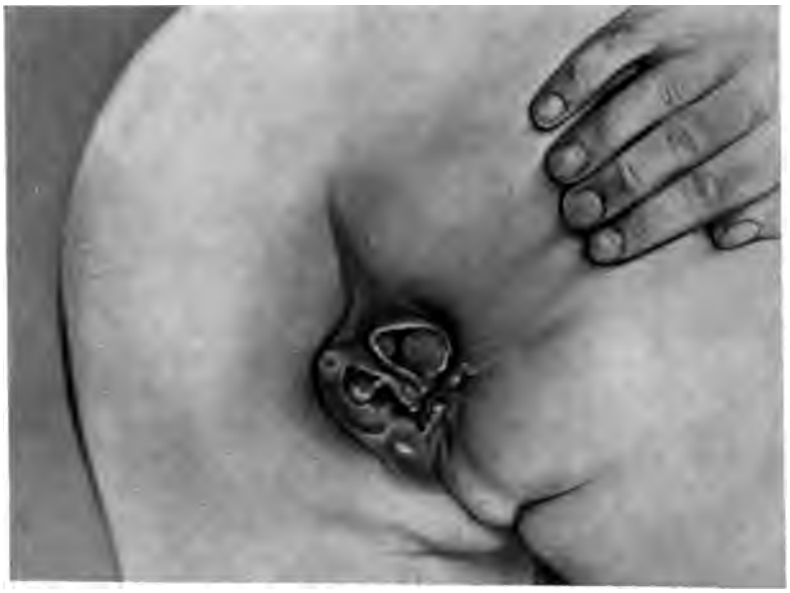

Fig. 32.—Disintegrating anorectal adenocarcinoma (author's case).

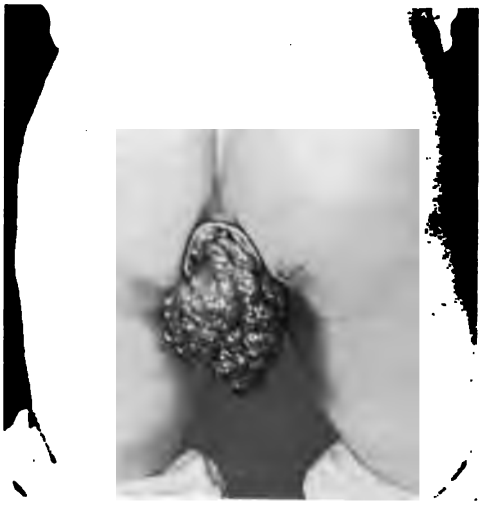

Fig. 33.—Simple adenoma, larger than a man's fist, photographed from life, removed by operation for the relief of chronic obstructive constipation (author's case).

Malignant and Non-malignant Neoplasms.—Tumors and cysts (Figs. 31-35) of all kinds, irrespective of their benign or malignant character, situated within or in close proximity to the bowel or involving neighboring organs, frequently induce constipation.

In such cases the infrequent evacuations are the result of an obstruction to the passage of the feces, which may be caused either by a growth within the bowel, or a stricture following ulceration and repair, or a neoplasm encircling the intestine, or it may be the result of a tumor situated in the abdomen or pelvis, or involving some neighboring organ, with direct pressure upon the bowel or blocking the anus (Fig. 35).

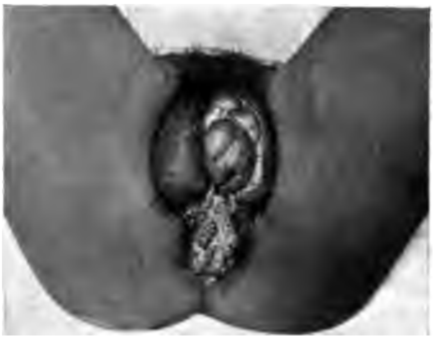
Fig. 34.—Fibromata of anus and vulva (author's case).

In other cases costiveness is not due to obstruction, but is the result of interference with the nervous mechanism and function of the intestine; the bowel being matted to neighboring organs or other parts of the gut, due either to a slight involvement by the neoplasm or to the inflammatory exudations, which are always encountered to a greater or less extent in this class of cases.

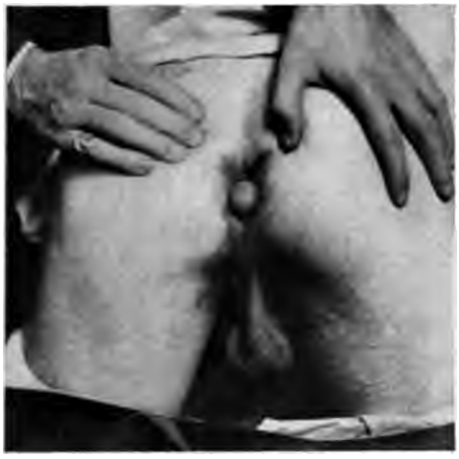
Fig. 35.—Anal cyst which excited sphincteric spasm and induced constipation (author's case).

Foreign Bodies (Intestinal Calculi, Concretions).—I have treated several cases of acute and chronic constipation induced by foreign bodies in the intestine, and a perusal of the literature shows that many similar cases have been reported by different writers.

Foreign bodies in the intestine may be grouped into three classes: those which have been (*a*) *swallowed*, (*b*) *introduced through the anus*, or (*c*) *formed in the body* (Figs. 29, 37, 39).

Foreign bodies of various sizes and shapes which have been accidentally swallowed, often while eating and drinking, are encountered more frequently than those which have been introduced through the anus or have been formed within the body.

Numerous instances have been reported of foreign bodies extracted from the rectum or through the abdomen, where they had been voluntarily or forcibly introduced through the anus by insane persons, rectal masturbators, criminals (for purposes of concealment), persons suffering from constipation who attempted to stretch the sphincter, and by victims of pruritus, who habitually scratch the parts with sticks, etc. Again, rowdies in a spirit of mischief have been known to force objects of various kinds and sizes into the rectum of sleeping or drunken persons, and robbers have resorted to this means of disabling their victims from walking. In some uncivilized countries prisoners are punished by forcing hot clay and other objects of torture into the bowel.

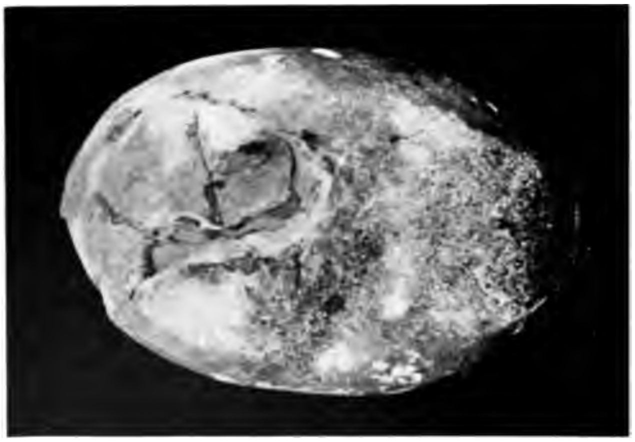

Fig. 36.—Urinary calculus weighing more than 4 ounces which ulcerated through the rectovesical septum and produced a stricture of the rectum (natural size) (author's case).

Some of the various objects known to have induced constipation and other symptoms of obstruction, and which have been removed from the intestine following their forcible introduction through the anus are: Sticks, stones, and bottles of various sizes and shapes, eating utensils, beer-glasses, nails, screws, keys, spools of thread, thimbles, syringe-nozzles, roller-bandages, skeins of yarn, pair of suspenders, lamp-chimneys, potatoes, radishes, carrots, turnips, burglars' tools, paper, cloth, jewelry, pencils, ferrules, and other articles too numerous to mention.

CHAPTER VII

MECHANICAL (OBSTRUCTIVE) CAUSES (*Continued*)

Intestinal Calculi (Enteroliths). Fecal Impaction. Adhesions and Tumefactions. Angulations (Flexures). Diverticula and Rectocele. Abnormal Mesentery. Volvulus. Hernia. Invagination (Intussusception) and Prolapse.

Intestinal calculi and **concretions** have been found in every portion of the intestinal canal. Statistics (my own excepted) generally agree that they are encountered more frequently in the small intestine and colon than in the lower bowel, are more common in women than in men, and in middle life and the aged than in younger persons.

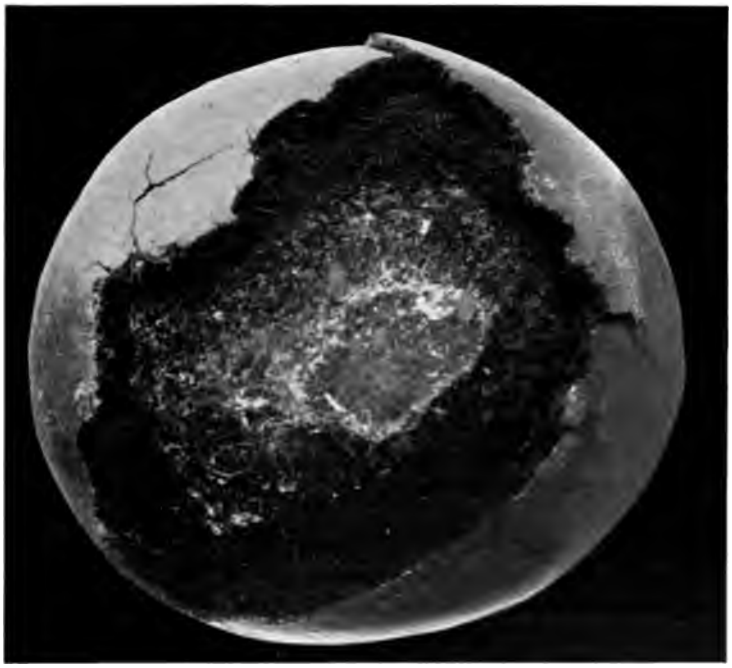

Fig. 37.—Hair ball (bezoar) from intestine of a horse, which caused obstruction.

There are many varieties of intestinal calculi and concretions, and I have been accustomed to group them as follows: (*a*) *Biliary calculi,* (*b*) *bezoars* (hairy concretions, Fig. 37), (*c*) *avenoliths* (oat-stones);

(d) enteroliths (Figs. 38, 39), *(e) pancreatic calculi*, *(f) urinary calculi*, *(g) coproliths*, *(h) prostatic calculi*, *(i) miscellaneous concretions.*

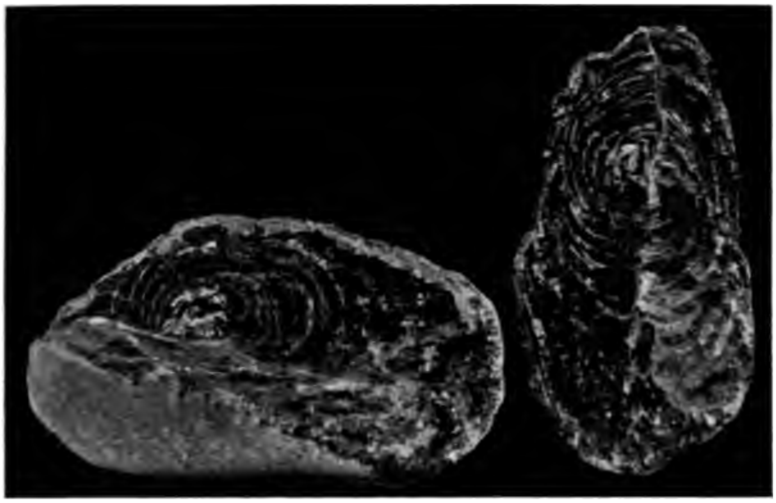

Fig. 38. Fig. 39.

Figs. 38, 39.—Enteroliths removed from the rectum (*about natural* size).

Representative instances of every variety of intestinal concretion are to be found in the following tabulation of 54 cases, which include 3 personal observations. The number of calculi present in each case varied from a minimum of one to a maximum of thirty-eight; 41 patients had but one stone, and 13 two or more. Their ages ranged from six to ninety-two years: 3 were under eight, 6 between fourteen and twenty-five, 4 between twenty-five and forty, 15 between forty and fifty, 8 between fifty and sixty, 9 between sixty and seventy, 7 between seventy and eighty, 1 between eighty and ninety, and 1 above ninety—the average being fifty years of age.

SYNOPSIS OF 54 CASES OF ENTEROLITHS AND INTESTINAL CONCRETIONS COLLECTED BY THE AUTHOR:

No. of case.	No. of stones.	Age.	Sex.	Location.	Composition.	By whom reported.
1	1	25	Male.	Jejunum.	Desiccated bile, feces, inorganic salts.	König.
2	12	50	Female.	"	Mg. and pot. phosphate, fat, amorphous material.	Bieber.
3	4	52	"	Ileum.	Inorganic salts, hair, feces, cotton fiber.	Mehrlust.
4	2	67	"	Jejunum.	Pot. sulphate and phosphate, Mg. and ammon. phosphate, feces.	Ellenbogen.
5	1	48	"	Cecum.	Starch, fat, dyalisin, inorganic matter, feces.	Burns.
6	6	73	"	Rectum.	Largely mineral phosphates and carbonates.	Holden.
7	1	55	Male.	"	Nucleus of plum-stone, bile-pigment, cholesterin.	Roeder.

No. of case.	No. of stones.	Age.	Sex.	Location.	Composition.	By whom reported.
8	2	60	Female.	Rectum.	Not given.	Welch.
9	1	70	Male.	Ileum.	Mineral phosphates and carbonates.	Van Buren.
10	1	72	"	"	Cholesterin, bile-pigments, salts.	Specht.
11	1	68	"	Cecum.	Ammon, Mg. phosphate, pot. and sod. carbonate.	Von Hirt.
12	1	78	Female.	Rectum.	Albumin, NaCl, K_2SO_4, $CaSO_4$, bile.	Mayer.
13	19	7	"	Trs. colon.	Phosphates of Mg., Ca., K., bile, feces.	Rothlein.
14	2	67	"	Rectum.	" " " "	Schmidt.
15	36	31	Male.	"	Nucleus of cherry-stones, feces, inorganic salts.	Woehr.
16	1	68	"	"	Ca., K., and Mg. phosphates and sulphates.	Traube.
17	1	23	Female.	Sigmoid.	Earthy salts and bile-pigment.	McDonald.
18	1	75	"	"	" " " "	Dieger.
19	1	49	"	Rectum.	Sod. sulphate, Am. and Mg. phosphates, Ca. salts.	Le Vale.
20	38	61	"	"	Mineral phosphates and carbonates.	Behring.
21	1	43	"	"	Unknown.	Chaikovsky.
22	19	64	"	"	Inorganic salts, cotton-fiber, hair, feces.	Blume.
23	1	8	Male.	Jejunum.	Bile-pigment, feces, amorphous material.	Hartse.
24	1	92	Female.	Cecum.	Bile-pigment, feces, amorphous material.	Lichtenberg.
25	1	63	"	Sigmoid.	Oat-husks, feces, bile-salts.	McCurdy.
26	1	57	"	Rectum.	Nucleus of peach-stone, bile, feces.	Hart.
27	6	29	"	"	Undetermined.	Layers.
28	1	39	Male.	"	Largely salts of Mg., Bi., and K.	Richardson.
29	1	74	"	"	Nucleus of calcined bile, periphery of petrified fecal elements.	Manley.
30	1	45	Female.	"	Not stated.	Boshe.
31	1	60	"	"	Feces, hair, inorganic salts, bile.	Pollock.
32	3	43	Male	Trs. colon.	Pot., cal., and ammon. phosphates and carbonates.	Grant.
33	1	50	"	Ileum.	Mineral phosphates, hair, feces.	Allen.
34	1	46	"	Rectum.	" " " "	"
35	1	48	Female.	"	Unknown.	Jaeger.
36	1	49	"	"	Bile-pigment, cholesterin, salts.	Hammer.
37	1	81	"	"	Starch, fat, cotton-fiber, feces.	Garden.
38	1	42	Male.	Des. colon.	Albumin, NaCl, Na_2SO_4, $CaSO_4$, feces.	Haussman.
39	1	14	Female.	Sigmoid.	Nucleus of cherry-stones, feces, bile.	Graf.
40	1	28	Male.	Rectum.	Ammon. and Mg. phosphate, bile.	Hut.
41	1	62	"	"	" " " "	"
42	1	49	"	"	Phosphates, carbonates, H_2O, cholesterin.	Martin.
43	1	16	Female.	"	Not given.	McDowell.
44	6	54	"	"	Mineral salts, feces, insol. material.	Brucke.
45	1	52	"	Sigmoid.	Calcium phosphate and carbonate.	Daniels.
46	1	6	Male.	Rectum.	Undetermined.	Coleman.
47	1	18	Female.	"	Starch, feces, cholesterin, fat.	Moore.
48	1	74	"	"	Plum-stones, inorganic salts.	Davis.
49	1	76	"	"	Undetermined.	Halle.
50	1	24	"	"	Ammon. and Mg. phosphate, calcium salts.	Thalman.
51	1	50	"	"	Ammon. and Mg. phosphate, calcium salts.	Fuller.
52	1	46	"	"	Cholesterin and mineral phosphates and carbonates.	Gant.
53	3	50	Male.	"	Bile-pigment, cholesterin, salts.	Gant.
54	1	43	Female.	"	Phosphates, lime, magnesium, and ammonium and organic matter.	"

The stones were located in every part of the intestine except the duodenum and ascending colon. They were in the rectum in 35 cases, in the sigmoid in 5, in the descending colon in 1, in the transverse colon in 2, in the cecum in 3, in the ileum in 4, and in the jejunum in 4. The most surprising and interesting facts brought out by the analysis of these cases are that the calculi were found nine times in persons aged twenty-five years or younger, and were located in the *rectum* more frequently than in all other parts of the intestine, showing that these statistics differ materially from those of other writers.

The degree of constipation caused by the presence of a foreign body in the intestine depends upon its size, shape, and location. Naturally, when it is large and fills or nearly fills up the caliber of the bowel, it produces very infrequent evacuations; but, on the other hand, if small and not situated at one of the flexures, there is a less degree of obstruction and the stools are more abundant and not so far apart. Foreign bodies themselves, except when very large, rarely cause constipation, but serve as a nucleus around which the feces collect until they have assumed proportions sufficient to obstruct the bowel and arrest a part or all of the feces. In most instances the constipation is not due to the obstruction offered by the foreign body, but is the result of enterospasm, secondary to an irritation of the mucosa caused by the rough edges or sharp angles of the contained body.

The constipation induced by foreign bodies may be of short duration in cases in which they give rise to complete obstruction or are expelled by way of the rectum; while in other cases the costiveness may become chronic, when they become encysted and remain for months or years in the same location.

I have elsewhere[1] published the case of a gentleman who came to me seeking relief from constipation caused by a large encysted urinary calculus, weighing more than 4 ounces (Figs. 29, 36), which had ulcerated through the bladder, projected into the rectum, and obstructed the bowel.

Fecal Impaction (**Coprostasis**).—The accumulation within the intestine of large, oval, hard, or semisolid fecal masses or scybala, when numerous and small, may very properly be placed among the obstructive causes of constipation (Fig. 40). They interfere with the fecal current and cause infrequent evacuations in the same way as do foreign bodies and concretions; that is, by producing more or less obstruction or interfering with peristalsis, or, lastly, by causing spasmodic or tonic contraction of the intestinal musculature from irritation to the mucosa caused by the offending mass.

Elsewhere in this work are tabulated 45 cases of fecal impaction treated by me, 22 of whom were males and 23 females. Their ages ranged from eighteen months to seventy-six years; 26 were thirty-five years or more, while 19 were under that age. The fecal masses, which varied in weight from 4 ounces to 12 pounds, were located thirty times in the rectum, five times in the sigmoid and rectum, six times in the sigmoid, once in the colon, sigmoid, and rectum, once in the descending colon, once in the cecum, and once in the transverse colon. The length of time these patients went without stool varied from two days to three months.

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[1] Gant, *Diseases of Rectum and Anus*, third edition, p. 639.

The causes of impaction directly and indirectly were as follows: Stricture, 4; carcinoma, 4; pregnancy, 1; careless habits, 5; congenital malformation of the anus, 1; traumatic stricture, 1; paresis, 2; parched corn, 2; fruit- and berry-stones, 2; adhesions, 2; fibrous bands in rectum, 1; chronic constipation, 2; fissure, 2; loss of intestinal tonicity, 5; retroverted uterus, 1; unknown, 1; inability to evacuate the bowel after hemorrhoidal operation, 1; hypertrophied sphincter, 1; gall-stones, 1; sarcoma, 1; hypertrophied "rectal valve," 1; green corn with portion of cob, 1; hypertrophied levator ani muscle, 1; disseminated polypi, 1; enterolith, 1.

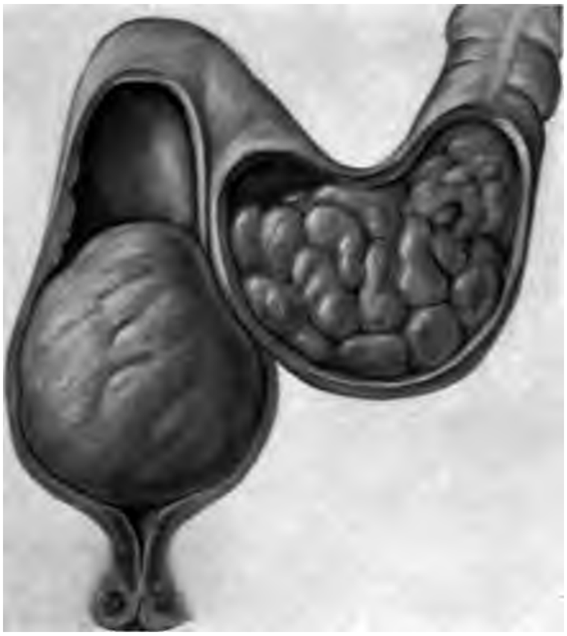

Fig. 42.—Chronic fecal impaction, the result of angulation at the rectosigmoidal juncture, showing the sigmoid flexure packed with scybala and the rectum filled with a large putty-like mass (after author's case).

I will not enter into a further discussion of *fecal impaction* here, for the reason that it will receive full consideration further on.

Adhesions and Tumefactions.—Chronic obstructive constipation is very frequently caused by adhesions and tumefactions. Adhesions which interfere with the propulsion and expulsion of the feces may be either short or long, narrow or wide, firm or friable, single or multiple, local or general, or irregularly distributed (Fig. 41). They may be met with as the result of intestinal disorders so common in childhood or from various causes in older people.

In order to appreciate and understand the question of adhesions in this class of cases, it is necessary to recall to memory the arrangement of the peritoneum, which not only covers practically all the viscera of the abdomen and pelvis, but the inner abdominal parietes as well. Surgical work, such as is required for gastric and intestinal anastomosis, fixation of the stomach, bowel, or uterus to the abdominal wall, and operations of a similar nature serve to demonstrate the manner in which adhesions may be formed between different viscera, by bringing together and retaining in contact their peritoneal surfaces, independent of whether they have been previously scarified or not.

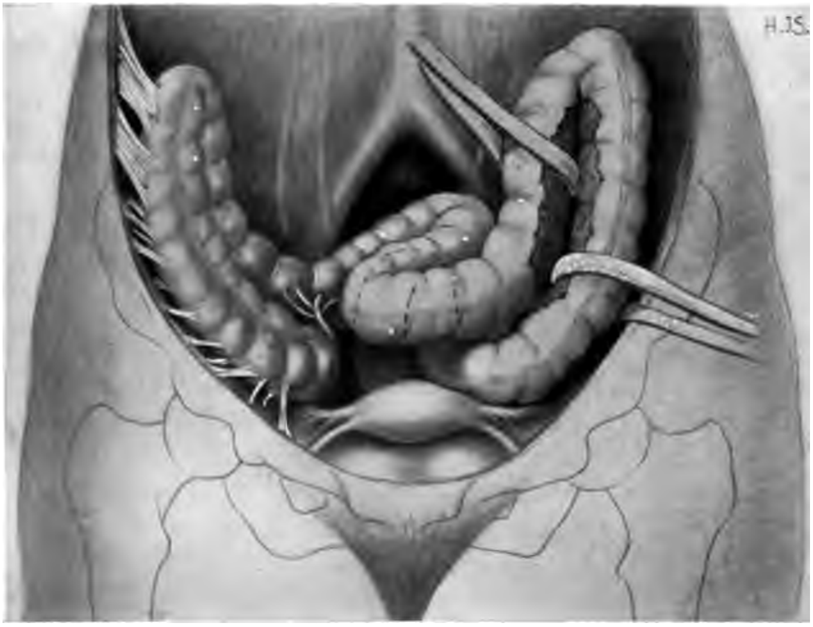

Fig. 41.—Complete collapse of the colon enteroptosis, complicated by adhesions which bound the cecum and ascending colon to the parietes and the transverse and ascending colons to each other.

If this can be made to occur with healthy viscera, it is not difficult to understand how the abdominal organs may become bound to each other by adhesions and tumefactions the result of acute or chronic inflammatory or suppurative disease of the abdomen or pelvis; or of neoplasms common to these regions; or from surgical operations necessitating extensive repair, especially when accompanied by the production of a large amount of inflammatory exudate; or when the raw surface of the viscera operated upon is permitted to come in contact with the peritoneal covering of a neighboring viscus.

Adhesions involving the bowel may not only be the result of disorders and neoplasms external to the intestine, as indicated above, but they can be caused by tumors or ulcerative or inflammatory disease situated within the gut.

I have treated many cases of intermittent and chronic constipation caused by adhesions resulting from extensive or repeated operations, typhoid fever, peritonitis, appendicitis, and diseases of the bladder, uterus, tubes, and ovaries, and other cases where the adhesions were caused by amebic dysentery, intestinal catarrh or ulceration, fecal impaction, foreign bodies, tumors, and strictures of the intestine. In some instances parts of the large and small intestine were rendered immobile by being matted closely together, to the omentum, or to other organs by tumefactions. Again, the intestine was connected with some other part of the bowel or other organ, at a greater or less distance from it, by delicate or strong, narrow or fan-shaped adhesive bands, while in still others, the bowel was found adherent or attached to the abdominal parietes (Figs. 41, 52–54). The parts most commonly affected, in the order of their frequency, were the cecum, sigmoid flexure, rectum, transverse colon, and small bowel. Sometimes the adhesions were small and few in number; at other times they were numerous and broad, and in rare instances so extensive as almost completely to envelop the bowel.

Adhesions and tumefactions may cause constipation and obstipation by interfering with the functions of the bowel in various ways. They may cause indigestion through disturbances of the nervous and circulatory systems; by permitting the formation and retention of enormous quantities of gas resulting in dilatation and sometimes paresis; by causing displacements, angulations, invagination, or twists of the intestine, thereby arresting or diminishing peristalsis; by inducing obstruction where the adhesive bands stretch across or encircle the gut; by exciting intestinal irritation and consequent enterospasm; by preventing mobility and activity of the bowel, which brings about atony; by producing hernia where a loop of the intestine slips through an opening or slit in the adhesions; and, finally, through the suffering it induces, this condition leads to chronic invalidism and constipation, owing to lack of exercise and the recumbent position maintained by this class of sufferers.

Angulations (Flexures).—Acute angulations or flexures of the intestine, congenital or acquired, which are fixed and have but little motion, act to a greater or less degree as an obstruction to the feces, no matter whether they are the normal flexures, congenital malformations of the intestine or mesentery, or the result of pathologic changes (ulcerative colitis, sigmoiditis, and perisigmoiditis). Such bends in the bowel I designate as *points of obstruction.* The most common site of angulations which induce obstipation is in the sigmoid and rectosigmoid juncture (Figs. 42–44). (Also Figs. 177 and 178 in Intestinal Exclusion.)

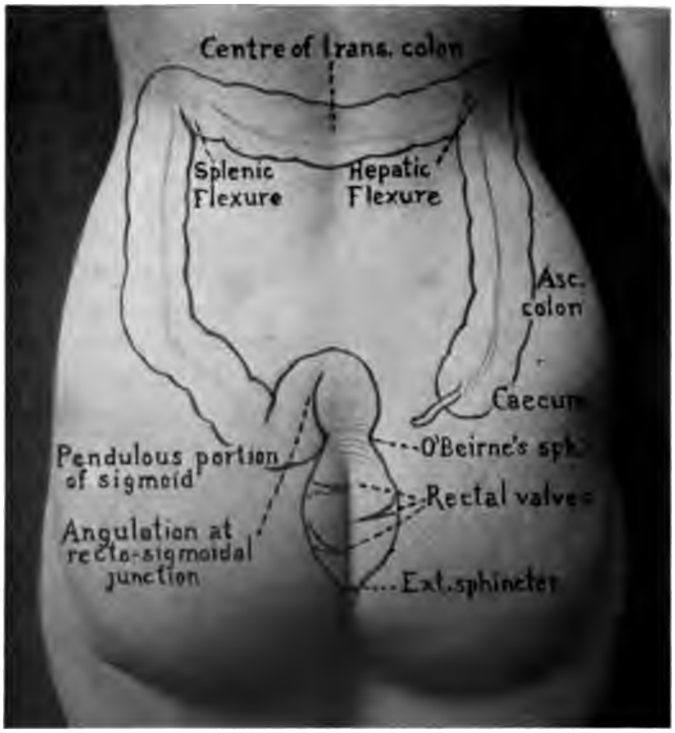

Fig. 42.—Diagrammatic drawing of colon, rectum, and anus, showing parts of the bowel where the progress of the fecal current is most frequently arrested.

The normal angulations in the colon, in order of occurrence from above downward, are the *hepatic*, the *splenic*, and the *rectosigmoidal* flexures. In the healthy individual there are doubtless many other bends in the small intestine, descending colon, and upper and middle parts of the sigmoid flexure; but they play but a small part as etiologic factors in constipation, for the reason that they are temporary or the bowel is not sufficiently tied down to interfere with the passage of the fecal current through these sections of the gut.

As I take it, the acute flexures seen at the liver, the spleen, and the rectosigmoidal juncture are placed there by Nature for a definite purpose. The colon is an assimilative and an excretory tube, and the flexures just referred to serve to retain the feces in different segments of the large bowel—viz., the cecum, ascending and transverse colon, and sigmoid flexure—for a sufficient time to permit absorption of the nutritive elements of the intestinal contents, leaving the non-nutritious matter, or excreta, in a semisolid condition and ready for expulsion.

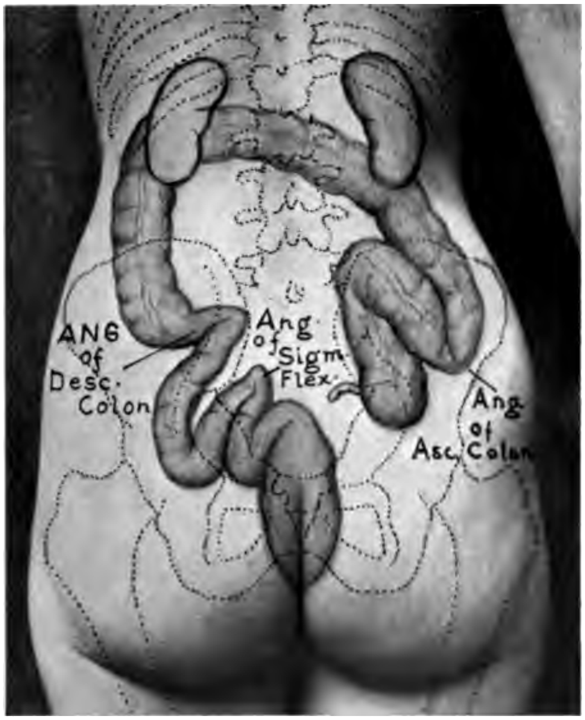

Fig. 43.—Ptosis of the ascending and transverse colons, complicated by multiple angulations (author's case).

If, as the result of general disturbances or local disease in the bowel, such as glandular and muscular inactivity, accompanied by a diminished lubrication of the intestine or interference with peristaltic action, the anatomic flexures serve to prevent the feces from passing these points, and they collect in the cecum, transverse colon, or sigmoid flexure, the result is infrequent and insufficient intestinal evacuation. In such cases, unless this condition is quickly relieved, fecal impaction ensues (Fig. 79), and the excrement may accumulate in such quantities as to cause a sagging or dropping downward of the different parts of the colon, resulting in enteroptosis of the cecum, transverse colon, and sigmoid flexure, either singly or in combination.

Owing to the fact that the bowel is anchored, by means of its mesenteric attachments, at the points previously named, this dragging downward of the bowel serves to aggravate constipation, for the reasons that the angulations are made longer and sharper, and, further, because the function of the bowel is materially interfered with as a result of its narrowed and strung-out condition. In so far as producing constipation is concerned, the same results obtain where the bowel is forced into acute flexures caused by adhesions, enteroptosis, a very long or very short mesentery, pressure upon the gut by neighboring organs, neoplasms, intestinal ulceration, shortening of the mesocolon by inflammation, tumefactions the result of chronic inflammatory abdominal or pelvic disease, or where it is constricted and drawn into unnatural positions by adhesive bands following surgical operations.

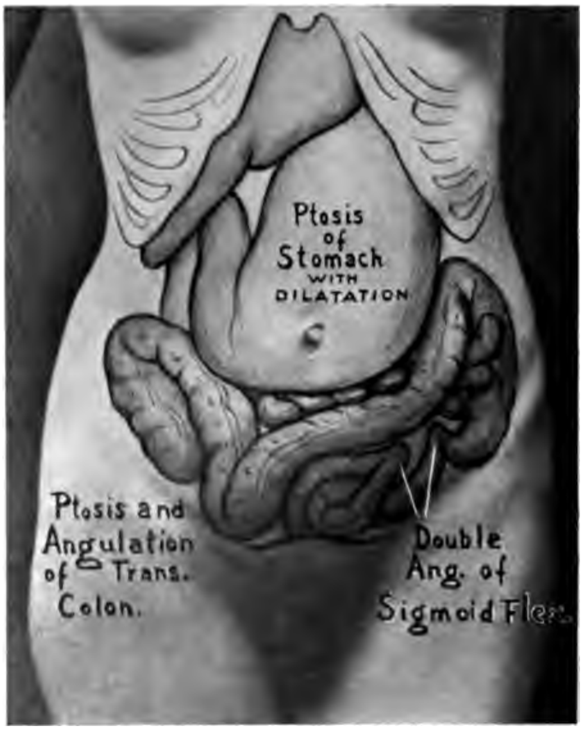
Ptosis of Stomach WITH DILATATION
Ptosis and Angulation of Trans. Colon.
Double Ang. of Sigmoid Flex.

Fig. 44.—Splanchnoptsis, general enteroptosis (Glénard's disease), complicated by double angulation of the bowel.

Costiveness due to angulations of the bowel may be acute or chronic, depending upon the amount of obstruction and irritation caused by it.

Some years ago I made extensive experiments to determine the relations of the rectum and sigmoid flexure to each other and to neighboring structures, when full and in the empty state, and further, to study the curves and angulations of these parts, and also the resistant power of the gut under pressure. The bowel was distended through a small tube around which the lower end of the rectum had been ligated. In the different experiments gas, water, formaldehyd, and plaster of Paris were used to fill the bowel. In brief, I may state that the results obtained convince me, in the first place, that it is very easy to rupture the bowel, and that it is not safe to use water or gas in endeavoring to reduce invagination; second, that in the distended state the sigmoid lies to the right and not to the left of the pelvis; third, that the difficulty encountered in passing instruments into the upper rectum is due to the projection of the rectal valves into the lumen of the gut (Fig. 3) and not to angulations or folds of mucosa; fourth, that the sphincter of O'Beirne is of variable size in different subjects; fifth, that immediately above the upper or third rectal valve, which is situated at the margin of O'Beirne's sphincter, the bowel drops downward, making a very sharp angle between the rectum and sigmoid flexure (Figs. 1–3), rendering the passing of the sigmoidoscope exceedingly difficult; finally, that the sigmoid is firmly anchored at this point and above at the mesosigmoid, making, as it were, a swing out of the intervening, irregularly shaped loop, which serves as a receptacle for the feces until the time of defecation arrives.

After completing these experiments and noting the different angulations and other anatomic obstructions to the free passage of the feces in the colon, sigmoid, and rectum, I have marvelled at the fact that one is ever able to have an unaided evacuation.

To those familiar with the angulations and other obstructive points which are found in a normal gut, it is easy to understand how constipation may be produced by any pathologic change in these parts which exaggerates or increases the obstruction to the feces already placed there by Nature.

Diverticula (Sacs or Pouches and Rectoceles).—Among the rarer obstructive causes of constipation may be mentioned diverticula. These pouches or pockets which lead off from the intestine (Fig. 45) may be congenital or acquired, single or multiple, small or large, shallow or deep, cord-like or hollow, and may be encountered in either the small or large intestine.

In the small bowel they are met with less frequently in the jejunum and upper part of the ileum than in the second part of the duodenum and lower ileum, while in the large intestine they are encountered most frequently in the sigmoid flexure and parts of the bowel where the feces tend to collect and cause sagging of the gut.

I have elsewhere[1] cited a remarkable case of extensive multiple rectocolonic diverticula. Of all the reported cases of this sort known to have suffered from chronic constipation, the most interesting and celebrated is that published by Fütterer and Mittendorf, quoted by Illoway,[2] of a boy fourteen years of age, who died as the result of a large diverticulum of the sigmoid, which resulted in chronic obstruction and enormous distention of the abdomen.

Diverticula when single and small cause but little if any disturbance, but when they are multiple and inflamed or large they may give rise to chronic constipation and much pain. When of sufficient size they cause complete and infrequent evacuations by acting as a sac or pocket (Fig. 46), in which the feces may accumulate, delaying their downward passage. When a large quantity of fecal matter collects within them they further tend to bring about a state of chronic costiveness (Fig. 47) by interfering with peristalsis, inducing obstruction, and dragging the bowel downward, causing enteroptosis and angulation or exciting enterospasm, thereby increasing the obstacles in the path of the fecal current through the unhealthy segment of the bowel. When narrow and long, they act like bandular adhesions and cause obstruction by direct pressure upon or strangulation of the intestine.

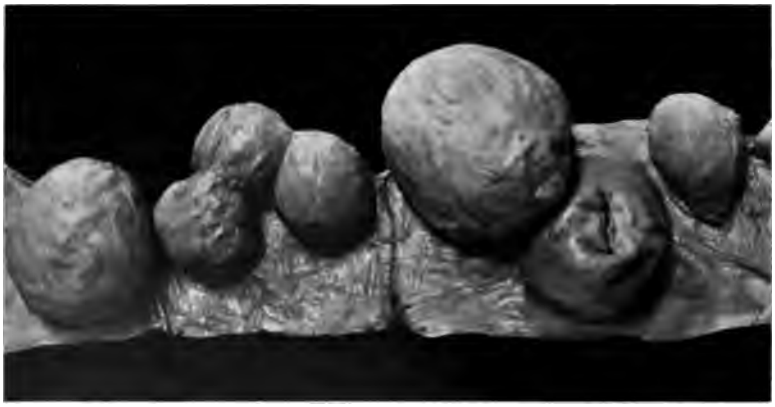

Fig. 45.—Rectocolonic diverticula. Photograph of specimen in the Carnegie Laboratory, which the author was permitted to photograph through the kindness of Dr. McAlpin.

These pockets may be congenital, or secondary to ulceration, where the intestinal contents have escaped little by little, beneath the mucosa, until a large or small sac is formed which serves to collect the feces. It may then become encysted, or from time to time it may discharge its contents, as the result of purgation or irrigation. In rare instances diverticula are found which contain nothing but mucus.

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[1] Gant, *Diseases of Rectum and Anus,* third edition, p. 5.

[2] Illoway, *Constipation in Adults and Children,* p. 72.

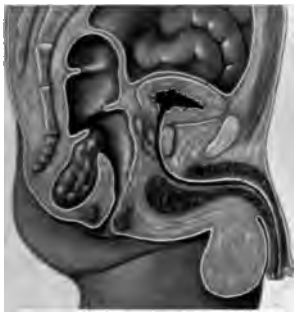

Fig. 46.—Obstruction from rectal diverticulum; bifid rectum (author's case).

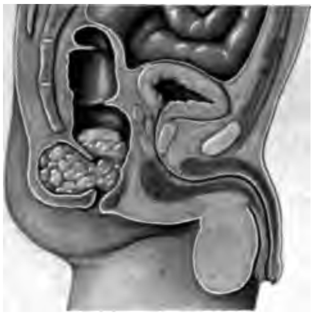

Fig. 47. Impaction in posterior rectocele, which resulted from a congenital absence of the coccyx (author's case).

For present purposes, however, the above types of diverticula are not so interesting as are *acquired intestinal pouches* (hernia of the mucosa),

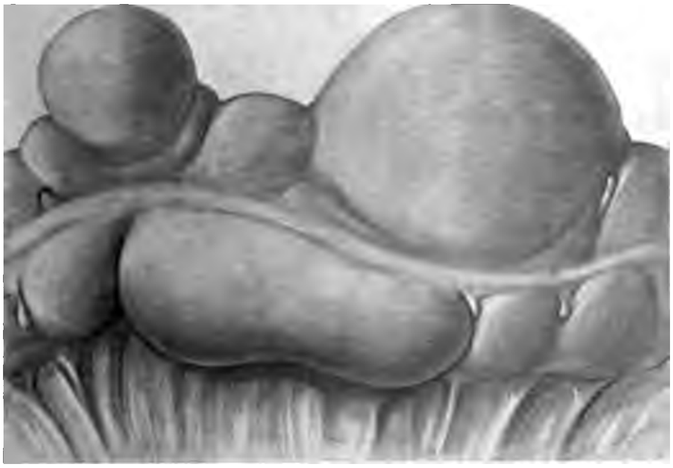

Fig. 48.—Colonic diverticula which caused [illegible] obstruction (author's case).

which may form in different parts of the bowel where the muscular coat gives way. The above conditions diminish the propulsive power of the bowel, favoring impaction, until a decided bulging at this point occurs. If the condition leading up to this state of affairs is not speedily corrected, pouches of considerable size are formed which cause chronic constipation in the same manner as do diverticula of other types. Such pouches may be single or multiple when there is a general weakening of the intestinal musculature (Fig. 48). Their seat of predilection in the colon is in those segments of the gut where there is likely to be sagging, such as the cecum, transverse colon, and sigmoid flexure.

I have treated cases of constipation due to sacculations under the above conditions; and I have also treated other cases where the pouches were the direct result of constipation and consequent fecal impaction, in which the feces became encysted or collected in quantities sufficient to stretch the muscular fibers, or remained a long time, resulting in atrophy of the intestinal musculature from pressure induced by the fecal mass.

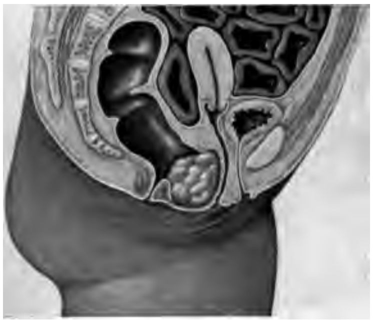
Fig. 49.—Anterior rectocele (author's case).

Rectocele.—When the recto-vaginal septum is relaxed it sometimes bulges downward and forward, forming a pouch which acts as a receptacle in which the feces may accumulate sufficiently to delay normal evacuations; or, in rare instances, when the excrement is hard and considerable in quantity, it may cause almost complete retention. I have cared for a lady suffering from a rectocele which was so extensive that a pouch was formed in the anterior rectal wall large enough to hold and retain ½ pint of feces (Fig. 49).

Another interesting case of diverticulum which came under my observation was that of a man aged forty in whom the bowel terminated normally at the anus; but at a point 2 inches above the anal aperture there was an orange-sized opening into a pouch, which passed downward and backward, displacing the coccyx posteriorly. The sac frequently became packed with feces interfering with defecation (Fig. 46).

I have also treated a girl of twelve and a young man twenty-six years of age (Fig. 49), in both of whom there was congenital absence of the coccyx. Both patients suffered from constipation due to the bulging posteriorly of the lower rectum and the formation of shallow oval pouches, in which the feces frequently became impacted.

My experience with the above cases has led me to believe that pouching or sacculation is a more frequent cause of chronic constipation than a perusal of the literature would lead one to believe.

Meckel's Diverticulum (*Remains of the Vitelline Duct*).—Before leaving this subject I would like to call attention to Meckel's diverticulum of the ileum, which occurs about once in every 125 subjects. When it is present and becomes involved in inflammatory processes, it may induce constipation by stretching across or encircling the intestine or by obstructing the fecal current, when adhesions form between it and the bowel of sufficient strength to drag upon and cause angulation or twisting of the intestine; or, it may become distended, press upon the surroundings, and strangulate the bowel.

Abnormal Mesentery.—The small and large intestine get their blood and nerve-supply through their mesenteric attachments, which anchor them to the inner abdominal parietes. The mobility of the bowel depends principally on the limitations of its mesenteric ligaments. As is well known, some parts of the gut, such as the cecum, hepatic and splenic flexures, have but a very limited degree of mobility; the transverse colon has considerably more; while the sigmoid colon has a very wide range of motion. This variation in the possible limits of the movements of the intestine is due to the fact that the respective parts of bowel mentioned possess short, medium, or long mesenteries. This anatomic fact I have demonstrated many times, both at the post-mortem and at the operating-table.

The mesenteric connections of the same parts of the bowel vary greatly in different persons. After opening the abdomen in performing colostomy it has been my custom to draw the colon out, and pull the upper section of the loop downward and the lower section upward until both ends are taut, in order to prevent procidentia following the establishment of the artificial anus. In doing these operations, I have found it almost impossible in some cases to bring the bowel sufficiently high up into the wound to make an effective anus, because of its extremely short mesentery; while in others, where the bowel had a fairly large mesentery, 3 to 5 inches of the gut could be easily brought outside the abdomen; and in still others I have been able to carry out of the wound 6 to 20 inches of the colon.

In my experience, both in the living and the dead, I have encountered medium and long mesenteries more frequently than the short variety. In a number of instances I have treated patients suffering from constipation which was produced or aggravated by either a short or a long mesentery.

An abnormally *short mesentery* (Figs. 50, 51, C) tends to produce infrequent evacuations, primarily by lessening the mobility of the bowel during peristalsis, and by drawing or pulling upon the intestine, narrowing its lumen or producing angulations; and, secondarily, through continued traumatism to the gut, setting up an inflammatory process which eventually results in binding the bowel down by tumefactions and adhesions.

Constipation, however, is, I believe, more frequently the result of long than of short mesenteric attachments. A *long mesentery* (Figs. 50, 51, A) favors infrequent and insufficient evacuations, because it permits a great degree of mobility, and a sagging of the intestine which not infrequently leads to volvulus, intussusception, angulation, hernia, and enteroptosis; or the gut when displaced may become involved in the disease of other organs, or it may be pressed upon or interfered with by tumors or inflammatory processes, situated near or at a considerable distance from the normal location of the gut.

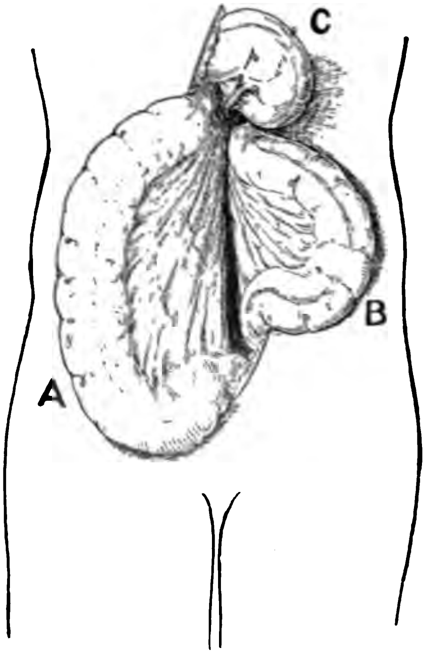

Fig. 50.—Showing appearance of the bowel and its mesentery when withdrawn from the abdomen; the mesentery is shown long in A, medium in B, and short in C.

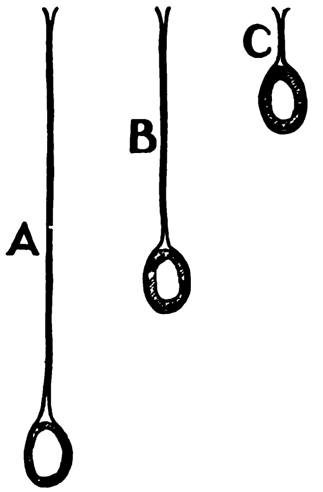

Fig. 51.—Showing variations in the length of the mesentery: A, Very long; B, medium; C, very short.

The degree of costiveness caused by abnormal mesenteries is variable, depending upon the amount of mechanical obstruction produced; in other words, when the fecal current is almost or completely blocked, intermittent or acute constipation occurs; but when the obstruction is slight and kept up for a considerable time, it brings about a state of chronic costiveness.

Volvulus (Twists).—Volvulus or twists in the intestine have been known to induce both acute and chronic obstipation or constipation.

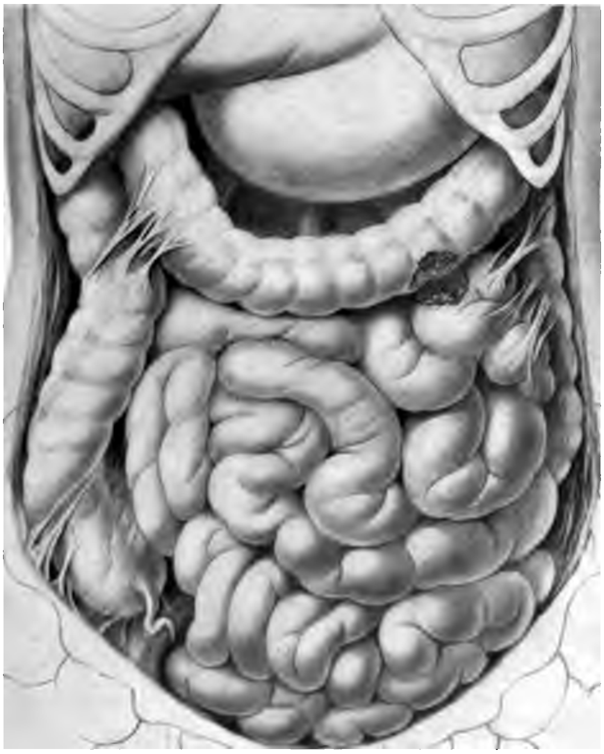

Fig. 52.—Volvulus (quarter twist) induced by adhesions. On the right side are shown adhesions involving both the large and small intestine (author's case).

Unusually long mesenteries, as mentioned above, or very long loops of the intestine, favor torsion or rotation of the gut, especially when they become involved in adhesions. Volvulus may occur in any one of three accepted ways—viz., where the bowel twists upon its own axis; upon its mesentery; or encircles some other loop of the intestine.

In some cases there is only a quarter (Figs. 52–54) or half twist (Fig. 53), producing partial obstruction, while in others the bowel may be twisted upon itself one, two, three, or even more times, resulting in complete obstruction.

Volvulus occurs more frequently in the large than in the small intestine, and is met with more often in the sigmoid flexure and cecum than in other parts of the colon. The sigmoid is especially prone to rotation upon itself because of its long mesentery; and further, because it acts as a receptacle in which the feces collect, and as it becomes filled it not infrequently rolls downward and to the right, resulting in angulation or volvulus.

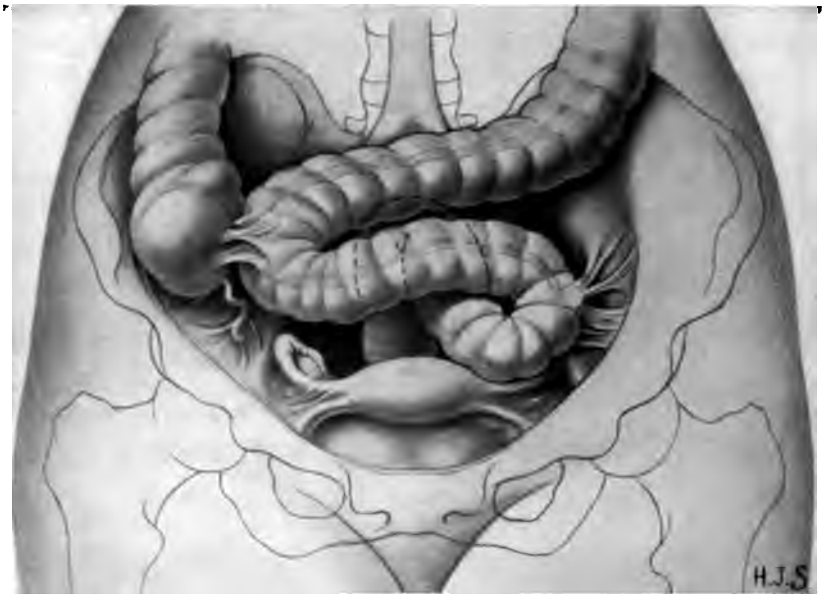

Fig. 53.—Volvulus (half twist) induced by adhesions which bound the sigmoid to the parietes on the left and the cecum on the right side (author's case).

Hernia (Fig. 55).—In giving the mechanical causes of constipation, it is necessary to point out the significance of hernia, which not infrequently causes acute constipation, but is one of the rarer causes of the chronic form. Small hernias occurring in the abdominal median line are not accorded the requisite amount of attention. Intestinal strangulation, inducing partial or complete obstruction, may take place at the umbilicus, the inguinal or femoral ring, or it may occur within the abdomen or pelvis, without giving rise to external signs; as, for instance, when the gut slips through the foramen of Winslow or is forced by an adhesion through some opening or rent in the mesentery or omentum and becomes strangulated.

Invagination (Intussusception) and Prolapse.—Any part of the intestinal tube is liable, under certain circumstances, to slip down inside its adjoining segment (Fig. 56) and to produce intussusception or invagination; very much in the same way as does a part of the finger of a glove when the hand is suddenly withdrawn (Fig. 57).

The invaginated piece of intestine may be short or may comprise several inches or feet of the bowel. I have frequently treated patients who by straining down could force through the anus a quantity of gut, varying in length in different cases from 2 to 15 inches. The amount of prolapsed bowel, in my cases, however, appears insignificant when compared with a case mentioned by Habershon,[1] where 44 inches of the large intestine were extruded.

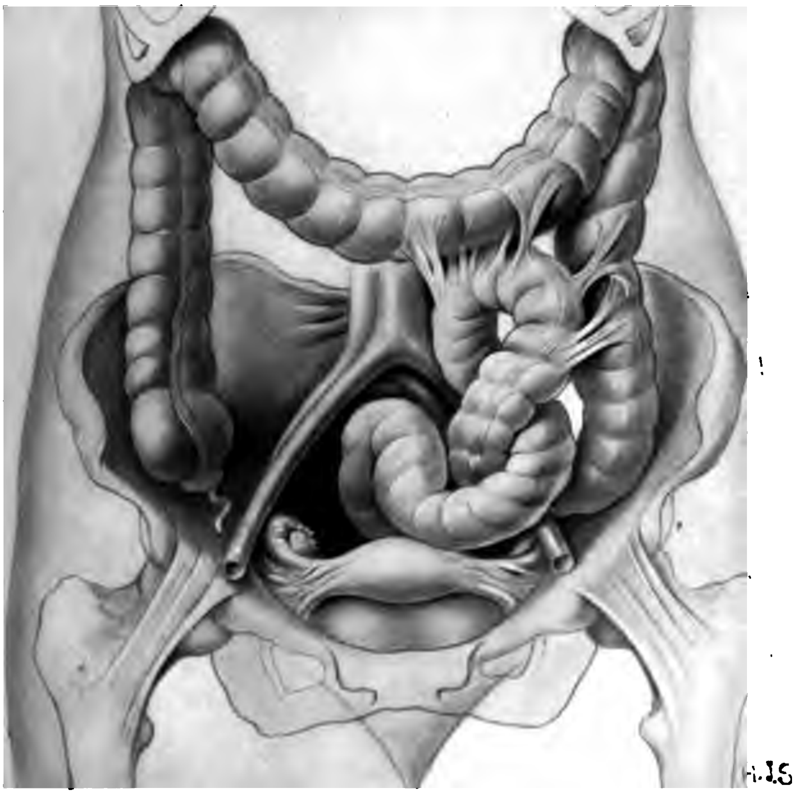

Fig. 54.—Volvulus (complete twist) induced by adhesions which bound the lower descending colon to the upper descending and transverse colons. The contracting action of the bandular adhesions produced a ptosis of the transverse colon and acute angulation at the splenic flexure (author's case).

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[1] Habershon, *Diseases of Abdomen*, p. 547, 1878.

As ordinarily given, the parts of the gut most often subject to invagination, in the order of their frequency, are: the ileocecal, iliac, jejunal, and colic regions of the bowel.

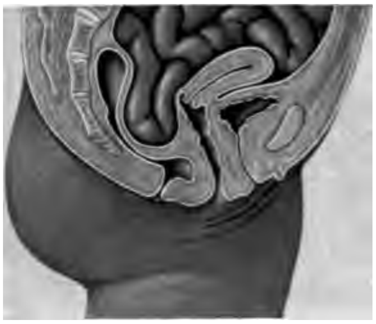

Fig. 55.—Rectal obstruction produced by massing of the small intestine in Douglas' pouch (hernia).

It is generally conceded that the most common site of intussusception is at the ileocecal valve, through which the ileum becomes prolapsed into the cecum. In my cases the invagination has taken place more frequently in the sigmoid and upper rectum than in other parts of the colon or small intestine. This may be partly accounted for by the fact that I very frequently see patients suffering from constipation and obstipation induced by chronic invagination; whereas, cases of acute intussusception, with total obstruction of the bowels, fall more frequently into the hands of the general surgeon. Constipation and intestinal catarrh, caused by chronic invagination of the sigmoid, colon, and upper rectum, occur far more frequently than is generally supposed. This form of invagination is encountered usually in adults, and in my experience is more frequent in women than in men.

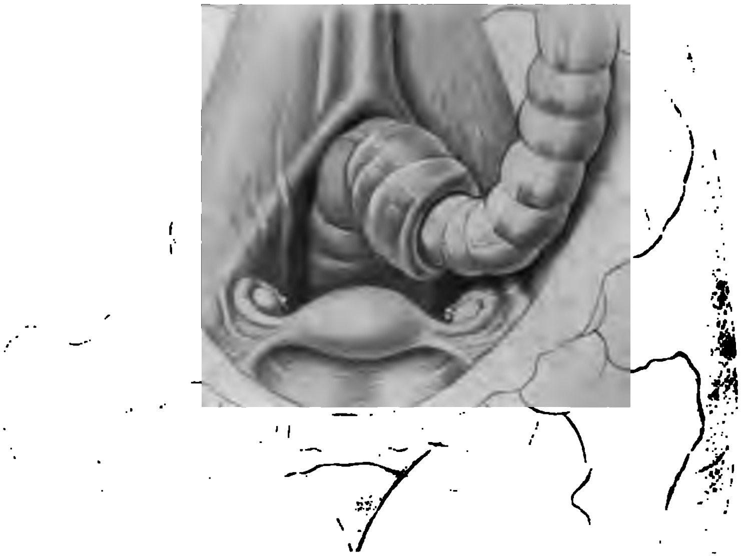

Fig. 56.—Showing chronic invagination, as viewed from above.

I designate it as chronic invagination, in contradistinction to the acutely obstructive intussusception, which occurs commonly in children, is sudden in onset, and produces such alarming symptoms.

Chronic invagination of the colon and upper rectum into the lower may be due to an abnormally long sigmoid, or an elongated mesentery, or may be caused by any condition which excites frequent stools, induces straining, or is conducive to relaxation and dragging down of the pelvic portion of the bowel (polyp, stricture, carcinoma).

I have elsewhere called attention to 25 cases of obstipation and constipation, of several years' standing, caused by chronic invagination, all of which were markedly improved or completely relieved by opening the abdomen and anchoring the gut to the inner abdominal parietes, after withdrawing the slack from the pelvis and allowing it to fall into the abdomen above. Since the publication of the above cases I have operated many times for the same condition with equal success.

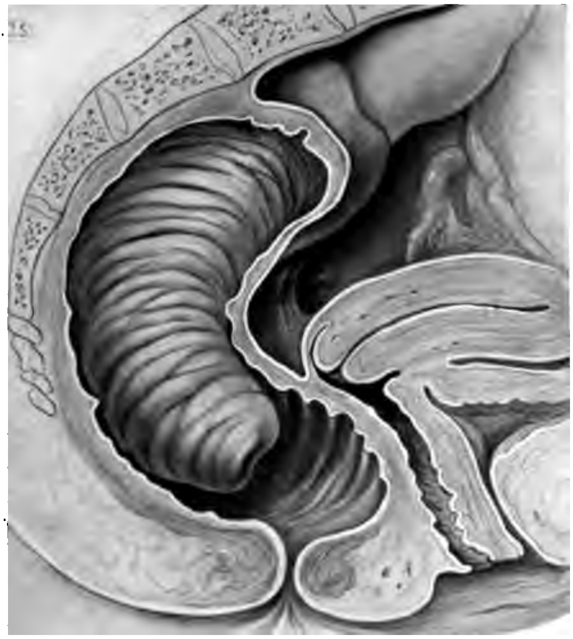

Fig. 57.—Showing chronic invagination, as viewed from below.

Chronic invagination and prolapse cause constipation by obstructing the lumen of the bowel; also by causing an inflammatory infiltration of all the coats of the gut, which lessens its mobility and interferes with its glandular activity and muscular power, thus crippling its propulsive and expulsive capacity.

CHAPTER VIII

MECHANICAL (OBSTRUCTIVE) CAUSES (*Continued*)

Splanchnoptosis and Enteroptosis. Paralytic Ileus. Dilatation of the Intestine. Enterospasm. Obstruction by Intestinal Parasites.

Splanchnoptosis and Enteroptosis.—A rarely suspected but nevertheless a very common cause of constipation is splanchnoptosis or Glénard's disease (Figs. 58, 59). This term, as now generally accepted, means an increased mobility and falling downward of all or one or more of the abdominal viscera, induced by the rupture or relaxation of their suspensory ligaments, or loss of the normal support of the abdominal wall.

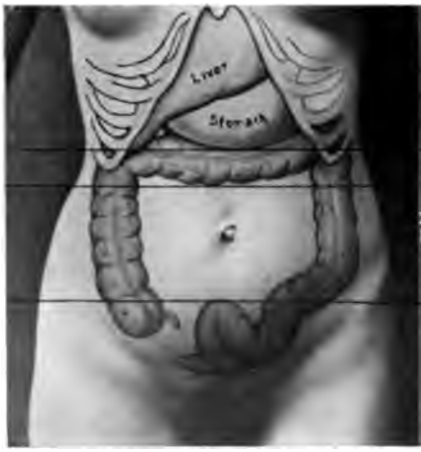

Fig. 58.—Normal position of the viscera.

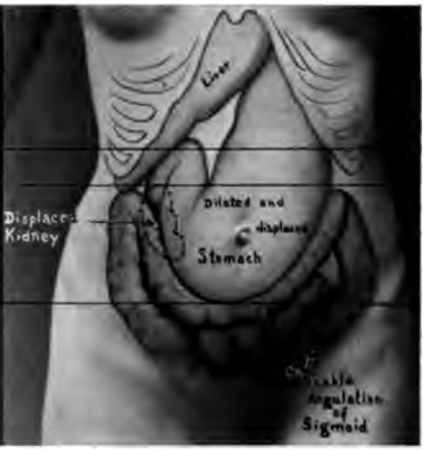

Fig. 59.—Abnormal position of the viscera in general enteroptosis (Glénard's disease).

The lines and the umbilicus have been placed upon the pictures to indicate the degree of displacement of the ptotic organs.

In order to avoid confusion, I will use the terms *enteroptosis*, *gastroptosis*, *hepatoptosis*, *splenoptosis*, and *nephroptosis* to designate the falling and displacement respectively, of the intestine, the stomach, the liver, the spleen, and the kidney.

In the normal state, on account of their longer ligamentous and mesenteric attachments, the *hollow viscera*, with the exception of the duodenum, cecum, and lower rectum, are much more freely movable than the *solid viscera*, such as the kidneys, liver, and spleen, whose mobility is curtailed, because these organs are more closely held by their peritoneal and ligamentous attachments to the diaphragm and the posterior abdominal parietes. The solid viscera have principally an up-and-down motion, which is due to the rise and fall of the diaphragm during respiration; while the movements of the hollow viscera are much more pronounced and are not confined to any particular direction.

Enteroptosis may be brought about as the result of an accident, where an organ or part of an organ is detached from its anatomic connections, or it may be caused by the lengthening of its mesentery or peritoneal attachments; by the impairment of its nerve-supply or atony of its musculature, by the absorption of the surrounding fat; or it may result from a flaccid abdominal wall after childbirth (Fig. 60); from tight lacing or congenital deformities of the thorax or the abdominal viscera.

Enteroptosis occurs more frequently in women (Fig. 76) than in men; in the 100 cases studied by me there were 64 women and 36 men.

The above-mentioned causes may produce splanchnoptosis in any individual, but a certain class of patients are representatives of the *habitus enteroptoticus*, and will acquire partial or total splanchnoptosis under conditions which would not affect normally constituted individuals. Habitus enteroptoticus is characterized by an elongated flattened thorax, sharp costal angles, and a floating tenth rib. In this class of cases, otherwise irrelevant factors, such as goiter, catarrh, mental anxiety, normal pregnancy, or chronic constipation, will develop the hereditary tendency into a complete splanchnoptosis. This type of enteroptosis is not so amenable to surgical and other methods of treatment as is ordinary "ptosis."

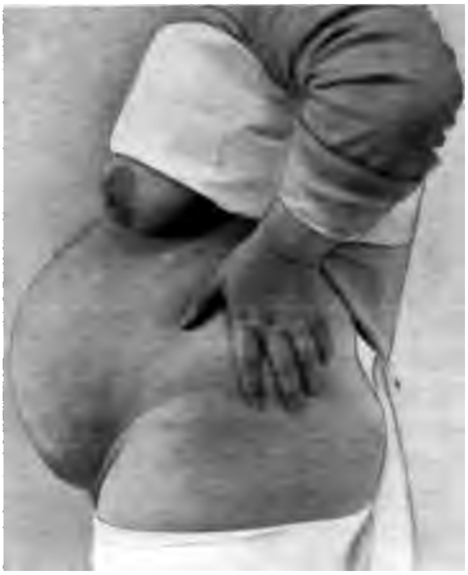

Fig. 60.—Splanchnoptosis, general ptosis, Glénard's disease, in multipara aged forty years, observed by the author, showing overhanging abdomen.

Recently it has been conceded by most internists of large experience that many ailments, formerly attributed to gastric and intestinal indigestion, are the result of Glénard's disease; or, in other words, the cause is the descent of the stomach, small or large intestine, kidney, or liver below the normal limitation.

I am in harmony with this view, as I have on many occasions been successful in quickly and permanently relieving by operative procedures many patients who were greatly reduced in weight and had the usual manifestations observed in this class of sufferers. In most instances pronounced relief followed the restoration of the viscus to its normal position.

These patients came seeking a cure for *constipation*, which is a common symptom of gastroptosis, enteroptosis, splenoptosis, nephroptosis, and hepatoptosis, either alone or in conjunction.

Authorities on diseases of the stomach and intestines maintain that in Glénard's disease there is usually a displacement, not only of the stomach, but of the small and large intestine, kidneys, and sometimes of the liver as well. My opinion, based upon a large personal experience, is not in harmony with this view. In the majority of the cases treated by me, not more than one viscus or part of a viscus has been found misplaced below its normal limitation. This difference in experience may be accounted for, however, by the fact that I confine my work mainly to the treatment of diseases in the colon, sigmoid flexure, rectum, and anus. It is quite natural, then, that I see more cases of enteroptosis of the colonic and sigmoidal type than do internists and those making a specialty of diseases of the stomach and intestine. When there is general enteroptosis, the transverse colon is usually pulled or dragged downward by the loosened kidney or stomach.

Enteroptosis rarely has its origin primarily in the small intestine. When there is a displacement of the small gut, it is usually secondary to and caused by a falling of some part of the colon, which forces the coils of the small bowel downward and into the pelvis. The stomach is not infrequently dragged downward far beyond its normal limitations by the intestine.

The opinion prevails that in most cases of enteroptosis there is a downward displacement of the hepatic flexure, almost from the incipiency of the trouble. I have not been able to confirm this view, for in my series of cases, in the order of their frequency, the sigmoid flexure (Fig. 56), transverse colon, cecum (Fig. 59), and descending colon were found displaced more frequently than the hepatic flexure.

When there is a falling of the hepatic flexure, it not only permits the cecum to descend to or below the pelvic brim, but it carries with it a goodly portion of the ascending and a part of the right end of the transverse colon. This results in an angulation slightly above the cecum and a displacement of the transverse colon, so that it passes from the right inguinal region diagonally upward to the splenic flexure, instead of transversely across the abdomen.

In cases of enteroptosis, where the transverse segment of the colon is involved, its shape varies, depending upon the extent of the displacement. Where there is only a slight sagging of its central portion, the configuration of the colon resembles the letter M, but in cases where it descends low down toward the pelvis, it is said to be V- (Fig. 207) or U-shaped (Fig. 61), according to whether the angulation is sharp or rounded.

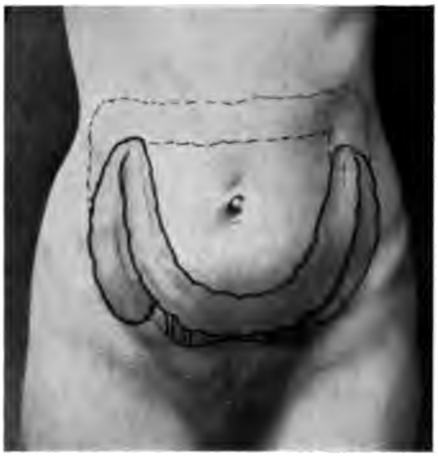

Fig. 61.—M-shaped ptosis of the transverse colon which produced angulation at the hepatic and splenic flexure.

Where there is an enteroptosis of the descending or sigmoid colon, it will be found piled up in an irregular mass in the left iliac region, the pelvis, and the upper rectum (Figs. 205, 206). I have seen two cases where the colon passed diagonally downward from the hepatic flexure to the rectum.

Owing to the fact that one rarely if ever sees two similar cases of intestinal ptosis, it is advisable to make an individual study of each in order to make a correct diagnosis.

Having a thorough knowledge of enteroptosis, it is not difficult to understand how it may cause constipation; vice versâ, it is easy to comprehend how constipation, where the feces are permitted to collect in the cecum, transverse colon, and sigmoid, may, by dragging the bowel downward, produce ptosis.

Constipation accompanying enteroptosis may be caused in many different ways. It may be induced by an angulation, constriction, or twist of the bowel, owing to its unnatural position, or to pressure caused by some other displaced organ or viscus. Again, it may be the result of indigestion due to reflex disturbances or to catarrhal inflammation of the bowel with accompanying glandular and muscular inactivity, caused by continued traumatism to the intestine. Finally, the almost constant stretching and bruising of the bowel excite a chronic inflammation, which results in tumefaction of the intestine and the formation of numerous adhesions, thereby interfering with its mobility. These adhesions may not only bind the bowel to the neighboring organs and the peritoneum of the abdominal parietes, but may also bind adjoining displaced segments of the gut together, forming a reduplication and giving rise to an acute angulation.

Paralytic Ileus.—Obstinate constipation is not infrequently encountered as the result of a paralytic state of the intestine, which diminishes or entirely prevents peristaltic action in a short segment or a considerable portion of the gut and brings about an enormous distention by gas and feces. Intestinal paresis (ileus) may be induced by mechanical irritation from traumatism, lesions of nerve-centers, pressure upon the bowel, or by reflex disturbances. Most frequently, however, it is secondary to an inflammatory process within the abdomen, such as accompanies peritonitis, typhoid fever, appendicitis, and similar conditions. It may result from gangrene of a segment of the bowel, due to mesenteric thrombosis of an artery; or it may follow obstructive diseases, like hernia, volvulus, and intussusception, which often give rise to great distention of the gut. Instead of being referable to distinct anatomic lesions, the symptoms of intestinal obstruction may be produced by bacterial poisons (toxic enteroparalysis). The rarest form of all is a purely functional nervous paralysis of the intestine, which must be ascribed to remote and more or less obscure causes. The common feature consists in the symptom-complex of mechanical occlusion of the bowel (obstipation) *intra vitam*, together with the demonstration of more or less perfect intestinal permeability on the post-mortem table. There are often recurrent attacks of obstipation even after the successful removal of the primary cause, for the persisting inactivity of the gut permits the feces to collect in amounts sufficient to block the lumen of the bowel.

This form of constipation is so familiar to those who treat surgical diseases of the abdomen and pelvis that I deem it quite unnecessary to dwell any longer upon this subject.

Dilatation of the Intestine.—Dilatation seldom occurs in the small bowel, but is quite common in the large gut, especially in the cecum, transverse colon, sigmoid, and rectum.

Some colons are congenitally large and long (megacolon), but dilatation of the bowel in adults is, as a rule, acquired (Figs. 62, 63), and when present always aggravates and, not infrequently, causes chronic constipation (obstipation). On the other hand, this condition is not infrequently secondary to chronic intestinal obstruction, and in such cases fecal impaction is of common occurrence (Fig. 63, A, B).

Ordinarily, dilatation is induced by overeating and other things which favor the collection and retention of gas or feces, or both, in sufficient quantities to enormously distend the intestine. Such accumulations balloon out the gut to such an extent that its circulation is impaired, the glandular and nervous mechanisms are interfered with, the muscular fibers are stretched or separated, and the fecal mass drags the intestine down, causing ptosis. This impairment of the bowel function interferes with absorption and peristalsis, and soon results in atony of the gut, which favors a further retention of the bowel contents and progressive dilatation.

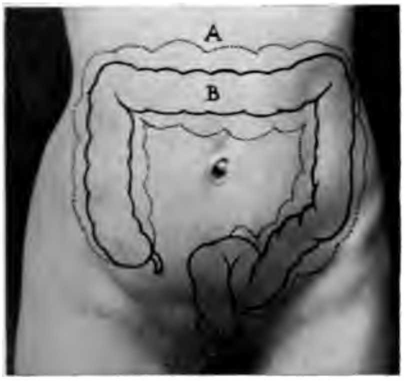

Fig. 62.—Showing difference in size between dilated (A) and normal (B) colon.

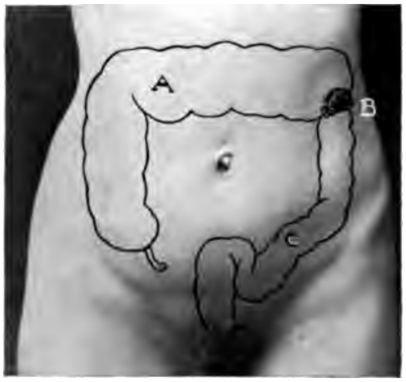

Fig. 63.—Showing dilatation of the colon from obstruction (A) and the causative growth (B).

From the above it will be inferred that the most common causes of dilatation are digestive disorders, tumors, strictures, extra-intestinal pressure, flexures, adhesions, tumefactions, and other conditions favoring the retention of the gases and feces.

Dilatation of the colon invariably leads to constipation because of insufficient glandular and muscular activity, and, further, because its large size permits the organ to become displaced and fall into flexures and angulations, thus adding a further difficulty to the propulsion of the feces. This condition, moreover, favors the constipated state, owing to the fact that the bowel is exposed to continual traumatism, which through chronic inflammation gives rise to tumefactions and adhesive bands, binding the gut to other segments of the bowel or to neighboring or distant organs, and leading to subsequent interference with peristalsis by limiting the movements of the bowel.

I have observed several cases of dilatation of the colon and its consequent constipation which were the direct result of scars and adhesions following surgical operations.

Numerous cases have been reported of abnormal enlargement of the colon other than that variety resulting from obstructive dilatation. Of the published cases, the most interesting and extensive is the one described by Formad, quoted by Illoway,[1] of a young man twenty-nine years old, who died suddenly in the water-closet. Autopsy twenty-four hours after death revealed the following facts: The colon was enormous in size and distended with gas and feces, the contained excrement alone weighing 40 pounds. The exact measurements of the gut were as follows: "Total length of colon, 2.52 meters (about 8 feet, 4 inches). The rest of the figures relate to the circumference of the bowel: Cecum, 26 cm. (10 inches); colon, ascending part, 37 cm. (15 inches); colon, transverse part, gradually increasing from 38 to 76 cm. (15–30 inches); colon, descending part, 60 to 62 cm. (24 to 25 inches); sigmoid flexure, 62 to 69 cm. (25–27 inches)."

Megacolon (Giant Growth of the Colon, Hirschsprung's Disease).—An enormous increase in the normal circumference and dimensions of the colon, while it may be acquired, is encountered, as a rule, as a congenital anomaly. The patient, therefore, is generally an infant or a very young child, with a congenital malformation of the rectum, an elongated sigmoid, acute intestinal flexure, aplasia, paresis, or anything which serves to obstruct the fecal current.

Altogether, but 5 cases of genuine megacolon and Hirschsprung's disease have come under my observation, concerning 3 males and 2 females; 2 patients were under one year of age, 1 was ten, 1 eighteen, and 1 thirty years old. Abdominal distention was a prominent feature in all these cases; some had partial, and others complete megacolon, resulting in a radical change in the topography of the large bowel. The most salient symptoms consisted in obstipation, recurrent coprostasis, abdominal bloating, moderate vomiting, anemia, malnutrition, gastric disturbances, gas pains, palpitation, also simple and ulceratve colitis.

Enterospasm (Spastic Constipation).—Among the rarer mechanical causes of constipation may be placed enterospasm. In this condition, a few inches or several feet of either small intestine or colon, or both, may become obstructed, as the result of a simultaneous contraction of both the circular and longitudinal muscular fibers (Figs. 64, 65).

Sometimes these muscular contractions are spasmodic, at other times they may become tonic in character and remain so for several hours, days, or weeks; resulting in infrequent and insufficient evacuations or total obstipation, depending upon the degree of the obstruction.

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[1] Illoway, *Constipation in Adults and Children*, pp. 65, 66, 1897.

In enterospasm the involved part of the intestine appears and feels like a long narrow, rigid tube, while the sections of gut above and below it retain their normal size, and, according to circumstances, may or may not be distended with gas and feces. Enteric spasm of sufficient gravity to induce constipation may be the result of ulceration, foreign bodies, reflex disturbances, or, more frequently, of digestive disorders; and in exceptional cases may manifest itself as a symptom in tabes dorsalis, hysteria, basilar meningitis, and other grave nervous disorders.

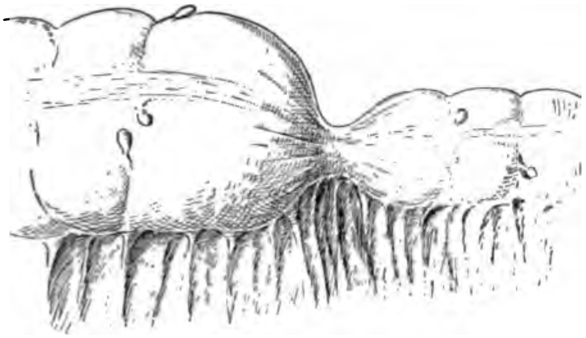

Fig. 64.—Enterospasm, narrow annular type.

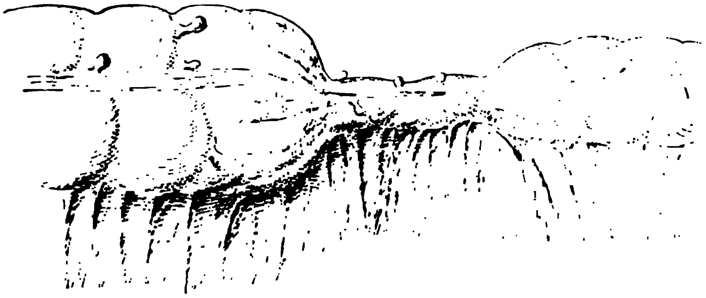

Fig. 65.—Enterospasm involving several inches of the bowel, tubular type.

Not infrequently writers upon intestinal disease have maintained that spasm of the sphincter muscle should be classified with these cases. I take exception to this view, for the reason that with spasm of the anal muscle there will be found some local disease which excites the sphincter to contraction, while the remaining musculature of the rectal tube remains passive. I once saw a beautiful example of spastic contraction where I made an exploratory incision to determine the cause of the constipation. In this case, upon attempting to draw the sigmoid up and out of the abdominal cavity, I found that it and the rest of the colon above, as far as the cecum, was so contracted by enterospasm that the bowel was not larger than the index-finger and completely obstructed, so that, in order to relieve the patient, it was necessary to establish an artificial anus at the cecum. The irritation which excited the spasmodic contraction in this instance was caused by a colitis with ulceration.

Obstruction by Intestinal Parasites (Worms).—Partial or complete obstruction of the bowel, preceded by enterospasm, may occur in certain rare cases as the result of irritation caused by the presence of worms, which block the intestinal lumen more or less effectually, either by becoming matted together in a bulky mass or in conjunction with the feces. Their presence can generally be detected by separating the anal folds and inspection through the proctoscope, as well as by the macroscopic and microscopic examination of the feces.

CHAPTER IX

MECHANICAL (OBSTRUCTIVE) CAUSES (*Continued*)

Hypertrophy of O'Beirne's Sphincter. Hypertrophy of the Rectal Valves. Hypertrophy of the Levator Ani. Hypertrophy of the Sphincter Ani. Deviated Coccyx. Diseases of the Rectum and Anus (Hemorrhoids, Ulceration, Fissure, etc.).

Hypertrophy of O'Beirne's Sphincter.—The narrowest part of the large intestine is where the rectum and sigmoid join. At this point the circular muscular fibers of the intestine are very much more numerous and stronger than in other parts of the colon. This band of involuntary muscular fibers has been designated as O'Beirne's sphincter, for the reason that it was first accurately described by him. O'Beirne believed and taught that if the sensation known as the desire to stool is ignored and the feces are not evacuated, they will, after a short time, be returned to the sigmoid flexure through a reversed peristaltic action, where they remain until there is another desire to empty the bowel. His idea of the function of this so-called sphincter was that it was designed for the purpose of delaying the feces, making the sigmoid flexure a receptacle or reservoir in which the excrement was to remain until time for defecation.

This desire to stool does not last long in cases where the rectum is not emptied; and all of us have had the experience of suddenly having a sensation that it was imperative for us to defecate immediately, but for lack of a suitable opportunity, or upon being suddenly called away, or having our mind directed to something else, we have omitted to empty the bowel; yet the desire to have an evacuation has disappeared. This ceasing of the sensation as if the bowel wanted to move, although there has been no evacuation, together with the fact that foreign bodies inserted into the rectum have been removed by laparotomy from parts of the intestine higher up, are arguments in favor of O'Beirne's view that the excrement is returned by reverse peristalsis to the sigmoid.

After colostomizing patients to give relief in cases of stricture located in the middle and lower rectum, complicated by a fecal impaction between the constriction and the opening made in the bowel, I have on several occasions witnessed the discharge of the feces through the opening in the groin due to reversed bowel movement.

In spite of the above apparently convincing evidence, it remains a fact that the feces do stay in the rectum in cases of deferred defecation in the great majority of cases, and this can be demonstrated by digital or rectoscopic examination.

I will not further discuss this most interesting subject, because at the present time I wish to direct special attention to O'Beirne's sphincter, and the way in which it may become an etiologic factor in constipation. Like all muscles, this sphincter responds to irritation, and it may become hypertrophied. A persistently inflamed or ulcerated mucosa or foreign body in the neighborhood may serve to excite spasmodic or tonic contraction of its muscular fibers, resulting in hypertrophy of the sphincter. This leads to constipation, for the reasons that the lumen of the intestine at this point is diminished; and, further, because as soon as the solid feces strike this irritable part of the bowel they excite a spasmodic contraction of O'Beirne's sphincter (Fig. 2), which partly or completely closes the bowel (Fig. 222, *A*), and prevents the passage of the feces into the rectum.

This condition may be temporary in some cases, but in others, especially in chronic affections of the sigmoid and rectum, the sphincter muscle becomes so irritable, hypertrophied, and strong that it offers just as much obstruction to the fecal current as if there were a cicatricial stricture at this point.

Hypertrophy of the Rectal (Houston's) Valves.—The history and description, with the number and location of these valves, has been given in the chapter devoted to the Anatomy and Physiology of the Intestine, and for that reason I will not discuss this part of the subject further. However, I wish to call attention again to the more salient points in their histologic composition (Figs. 5, 9–13), in order that pathologic changes occurring within them may be more easily understood.

The average valve is composed of: (*a*) mucous membrane; (*b*) submucosa (fibrous layer); (*c*) circular muscular layer; (*d*) longitudinal muscular layer; (*e*) subserous layer, consisting of areolar tissue and fat, arteries, veins, nerve-elements, and lymphatics. The ***mucous membrane*** covering the valve is of variable thickness and continuous with the membrane at the base of the valve. It consists of the epithelial lining, the stroma, and the muscularis mucosæ, which is more prominent here than in other parts of the rectum. The submucosa is composed of white, fibrous connective tissue, sometimes forming a dense layer, and was first described by Martin,[1] who maintains that it gives support to the valves, especially when hypertrophied.

The circular layer of muscular fibers is usually constant, and may extend only a short distance into the valve or almost to its tip. The longitudinal layer is present less often than the circular, and may extend across the base of the valve without contributing any fibers to its structure; or it may dip into the valve, reaching nearly to the distal end. In addition to these structures, Pennington[2] reports finding in the valve lymph-nodes, large sympathetic ganglia, epithelial structures imbedded in the loose tissue outside the longitudinal muscular layer, and, in one specimen, white fibrous and yellow elastic tissue in the same locality.

While the muscular coat usually enters into the structure of the valves, the latter are sometimes made up entirely of mucosa and submucosa.

The various elements composing the valves are, as a rule, more clearly defined in the adult than in the infant.[3]

Immediately after the feces have been discharged through O'Beirne's sphincter into the rectum, they come in contact with the uppermost rectal valve (Fig. 3), on the left rectal wall, where they may be arrested temporarily, or immediately glide off to fall upon the next valve on the right anterior wall, and from here in the same manner they pass to the lowermost valve on the left side, and then to the fixed rectum.

This arrangement permits a sort of rotatory and step-by-step descent of the feces, thus giving the levator ani and sphincter muscles time to prepare for their approach.

With this understanding of the location, make-up, and function of Houston's valves, it would not seem unreasonable that these same valves, when they become diseased, should play a very important rôle in causing chronic constipation.

Structures in the intestine and those having a similar composition in other parts of the body frequently lose their mobility and have their functions impaired as a result of chronic inflammatory processes, which result in hypertrophy. If this is so, there is no reason why the rectal valves should not lose their pliability and become sufficiently rigid to act as an obstacle to the passage of the feces in their downward course to the anus.

I am sure that constipation or, more properly speaking, obstipation is sometimes caused by hypertrophy of the rectal valves, but I do not concede that they are a very frequent etiologic factor in this condition. In fact, I am inclined to place them among the rarer causes of this condition. I have treated cases where costiveness was unquestionably due to hypertrophy or deformity of the valves. In some instances they were about as thick as a finger, fixed, and projected into the lumen of the bowel, resembling a shelf, upon which the feces remained until removed by instrumentation or irrigation. In other instances I have seen the valves located on the same plane, directly opposite to each other, and of such size that they almost completely encircled the bowel, producing the same degree of obstruction as would a stricture located at the same point (Figs. 9, 11).

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[1] Martin, "Obstipation," *Phila. Monthly Med. Jour.*, p. 421, 1899.

[2] Pennington, "Anatomy, Histology, and Pathology of the Rectum and Colon," *Chicago Med. Rec.*, Dec., 1900.

[3] Gant, *Diseases of Rectum and Anus*, third edition, p. 28.

After having studied the valves in health and in disease, it is easy to understand how they might be mistaken for a *spasmodic stricture* by the inexperienced examining finger, owing to the fact that they are located in the movable rectum and differ as to their height above the anus at various times. I have frequently examined patients where lumps of feces were supported by these valvular projections.

In conclusion, it seems to be quite plausible that the feces might find a resting-place upon these rectal valves and not be carried back to the sigmoid flexure, as believed and cited by O'Beirne, in those cases where there was no desire to stool nor any feces found in the lower rectum, following an earlier pronounced desire to stool without an accompanying evacuation of the bowel.

Hypertrophy of the Levator Ani Muscles.—The levator ani muscles embrace the rectum in a fork at the upper end of the anal canal, and assist in the act of defecation by lifting the bowel upward, squeezing it, and in this way forcing the feces through the already relaxed sphincter muscle.

These muscles sometimes become hypertrophied, and through their spasmodic contractions act as a direct obstruction to the passage of the feces, and cause constipation or obstipation. This thickening of the levatores ani results from pounding and consequent irritation to them by the fecal masses when they are habitually permitted to remain in the rectum for a considerable time. It may also happen that these muscles become thickened through reflex disturbances caused by diseases in the rectum, uterus, bladder, prostate, or urethra.

I have elsewhere[1] reported 5 cases of constipation due to this cause, and since their publication I have encountered a sufficient number of other cases to convince me that hypertrophy of the *levatores ani* is a much more frequent cause of chronic constipation than is generally assumed.

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[1] Gant, *Diseases of Rectum and Anus*, third edition, p. 102.

Hypertrophy of the Sphincter Ani.—Constipation may have much to do with producing hypertrophy of the anal muscle, especially when nodular feces are frequently allowed to accumulate and remain in the rectum, acting as a source of irritation; and, on the other hand, hypertrophy of the sphincter ani may cause chronic infrequent and insufficient evacuations.

While I am willing to concede that hypertrophy of this muscle is a common etiologic factor in producing chronic constipation, I am not willing to admit that it is so frequent a cause of this complaint as a perusal of the current literature would lead one to believe. Recently it has become the fashion to endeavor to cure all patients suffering from costiveness by stretching the sphincter. I have had many persons come to me suffering from obstinate constipation who had previously had their sphincters divulsed, and upon inquiry I have learned that in many instances this had been done without any examination being previously made to determine whether the anus were small or the sphincter hypertrophied.

Beginning in 1891,[1] I have in various articles and medical works called attention to the importance of the anal sphincter as a causative factor in producing or maintaining chronic constipation.

Constipation may be induced or aggravated also by sphincteric contractions when the muscle is not hypertrophied, but is constantly excited to spasmodic contraction by the presence of local disease at the anus, such as fissure or hemorrhoids.

The function of the sphincter muscle is to keep the anus closed and prevent the escape of the bowel contents in the intervals between the evacuations, and to assist in the act of defecation. When the excrement passes the lowermost rectal valves the levator ani muscle draws the anal canal upward and over it. At this stage there is a desire to stool, and as a result of the peristalsis and pressure exerted by the abdominal muscles, the feces are forced downward and the sphincter ani muscle voluntarily relaxes to allow them to pass; simultaneously the levator ani (Fig. 15) contracts behind and expels them, thus completing the act of defecation.[2]

When the muscle has become diseased and hypertrophied as the result of overwork, excited by fissures, ulceration, hemorrhoids, polyps, foreign bodies, or collections of hard scybala, which have been allowed to collect in the rectum from time to time, it acts as an obstruction to the free passage of the feces instead of assisting in defecation, and must necessarily be classed among the mechanical or obstructive causes of constipation.

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[1] Gant, *Diseases of Rectum and Anus*, third edition, p. 33.

[2] *Ibid.*

Deviated Coccyx.—I have treated many cases of chronic constipation which were caused by a deviation, deformity, or absence of the coccyx (Figs. 66, 67). In nearly all these patients the lower segments of the bone were fixed and projected inward, almost or completely at a right angle with the sacrum. Chronic constipation may also be induced by a sacrococcygeal tumor (Fig. 68) or by the formation of rectoceles when the coccyx is absent (Figs. 47, 66). To give some idea of the frequency of malformations, diseases, injuries, and tumors of the coccyx, I will give a brief summary of 37 cases treated by me in the subjoined table:

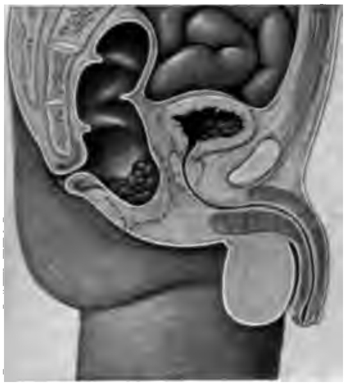

Fig. 66.—Showing congenital absence of the coccyx and anal outlet at the end of the sacrum, also a pocket which served as a reservoir for the feces and caused recurrent fecal impaction (author's case).

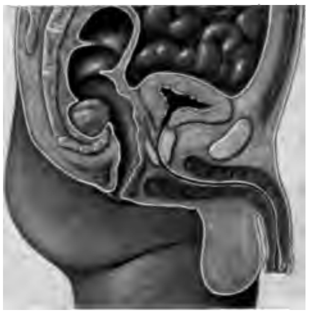

Fig. 67.—Obstipation produced by a deviated coccyx; posterior rectocele (author's case).

	Disease, injury, or tumor.	No. of cases.	Female.	Male.	Average age.
Varieties of diseases treated.	Fracture or dislocation	8	4	4	31½ years.
	Coccygodynia	12	8	4	31⅓ "
	Inflammation of coccygeal body	2	2	0	24½ "
	Congenital deviation of coccyx	2	2	0	30½ "
	Necrosis of coccyx and fistula	4	2	2	34¾ "
	Absence of coccyx and sacrum	2	1	1	29 "
	Ulceration of coccyx through rectum	1	1	0	24 "
	Dermoid cyst of coccyx	2	0	2	38½ "
	Gunshot wound of coccyx	1	0	1	40 "
	Nail driven in sacrococcygeal joint	1	1	0	36 "
	Coccygeal lipoma	1	1	0	35 "
	Retention cyst of coccyx	1	0	1	49 "
	Totals	37	22	15	33⅔ years.

Deformities and displacements of the coccyx of the type mentioned above serve to induce constipation by pushing the rectum inward, encroaching upon the intestinal lumen, forming a pocket where the feces collect, and thus obstructing the bowel. Or the point of the bone may force its way through the rectum, causing ulceration and irritation sufficient to excite the levatores ani and sphincter muscles to spasmodic contraction, and in this way interfere with defecation.

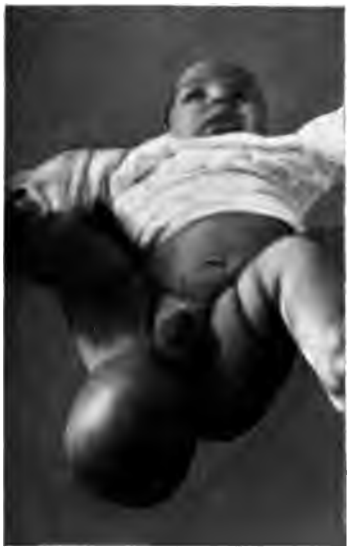

Fig. 68.—Sacrococcygeal tumor which induced obstipation. Case observed by my friend Dr. Lord.

Diseases of the Rectum and Anus.—I have previously discussed the manner in which constipation may be caused by a thickening or hypertrophy of the rectal valves and the levatores ani and sphincter muscles. It now remains for me to mention certain other local diseases of the rectum and anus which may directly or indirectly produce habitual costiveness. Of these the most common is *hemorrhoids* (Fig. 69). Hemorrhoids may produce constipation by obstructing the lumen of the bowel and interfering with defecation when the tumors are large; or by exciting the sphincter and levatores ani muscles to frequent contractions, thus leading the patient to postpone the evacuation of the bowel as long as possible, in order to avoid the defecatory and post-defecatory pain. Finally, in aggravated cases, they may excite a chronic inflammatory process in the rectum, which causes the mucosa to become thickened and less sensitive, diminishes glandular secretion, weakens the contractile power of the intestinal musculature, and lessens the mobility of this part of the bowel, causing it to become fixed through adhesive exudates which bind it to adjacent structures.

Fissure in ano is also a very common complaint, and constipation is invariably a manifestation of this disease. In cases of typical fissure or, as it is sometimes termed, "painful ulcer," expulsion of the bowel contents causes a separation of the edges of the rent, exposing the sensitive nerve-endings to injury by the feces. This causes primarily a sharp stinging pain at the anus, and secondarily dull agonizing pains over the coccyx and sacrum, lasting from a few moments to several hours, due to the spasmodic and tonic contractions of the anal sphincter. In order to avoid this terrible pain, these sufferers not infrequently defer an action for two or three days or sometimes as long as a week, and it becomes necessary to administer strong cathartics or enemata to relieve the bowel of the fecal accumulation.

Other patients having *fissure* complicated by sphincteralgia may suffer from constipation, even though they try hard to secure the daily evacuation, for the reason that the lower rectum is so extremely sensitive that when the feces strike it, the levatores ani and sphincter muscles contract, making it exceedingly difficult in many instances for the excrement to be expelled.

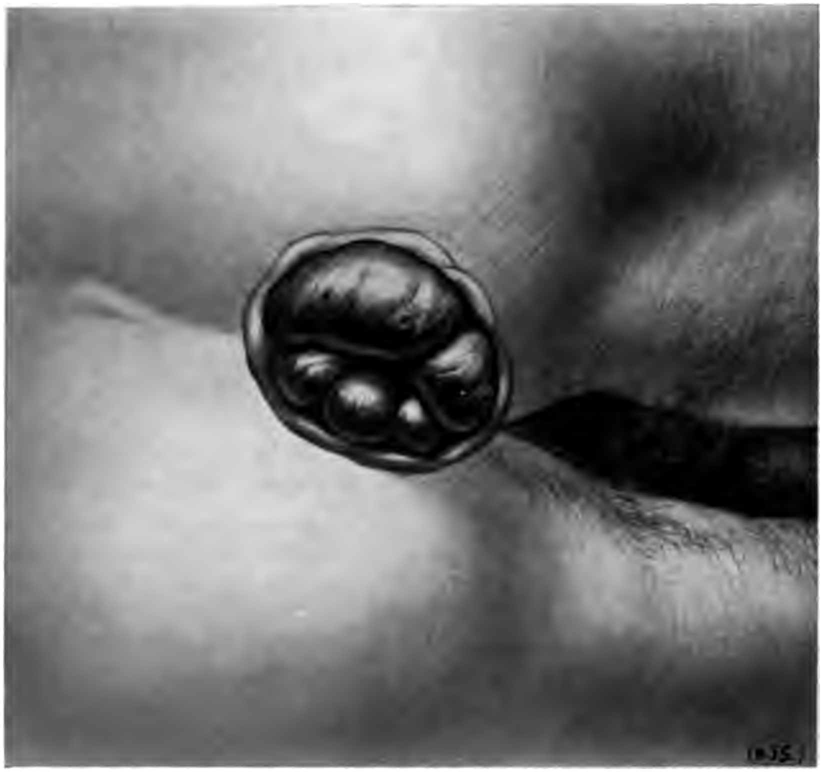

Fig. 69.—Extensive protruding internal hemorrhoids (author's case).

Finally, in protracted cases of fissure, the muscles just referred to may, as a result of continued irritation and overwork, become hypertrophied and produce chronic costiveness by acting as a permanent obstruction to the free passage of the feces.

Ulceration of the Rectum.—Ulceration of whatever kind (Figs. 70–73)

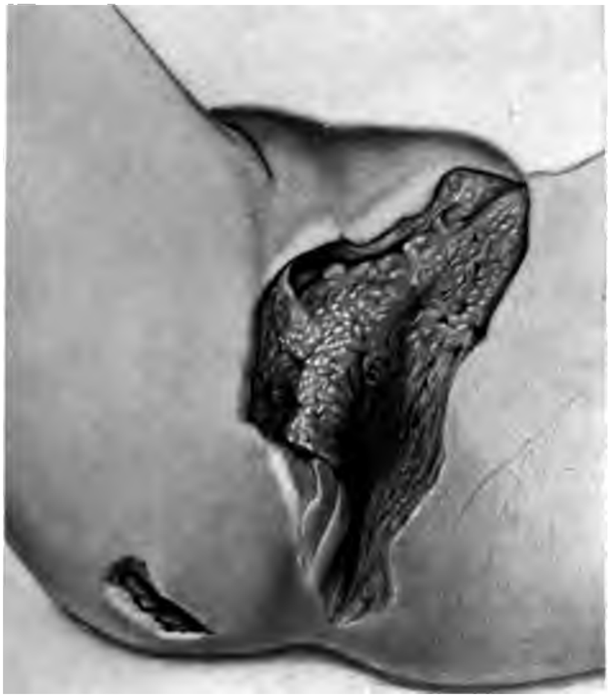

Fig. 70.—Stricture of the rectum and multiple fistulæ, induced by extensive sloughing, following rupture of the urethra and extravasation of urine (author's case).

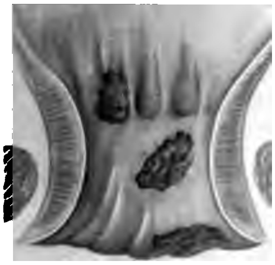

Fig. 71.—Anal ulceration.

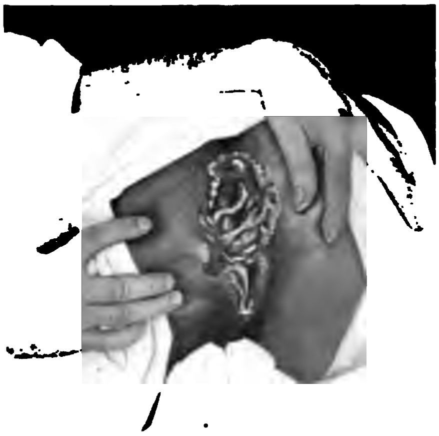

Fig. 72.—Extensive syphilitic [illegible] ulceration. Treated by Dr. Bogg and the author.

may be an etiologic factor in constipation because, through irritation to the exposed nerves, it may excite enterospasm when located high up in the bowel, or lead to tonic contractions of the sphincter and levatores ani muscles when situated near the anus; and, again, after the ulcers have been treated, it may result in stricture.

Among the other rectal and anal affections which have been known occasionally to induce insufficient and infrequent evacuations by obstructing the bowel, exciting sphincteric spasm, or inducing atony, are malignant and non-malignant tumors (Figs. 73–75), stricture (Figs. 29, 30), foreign bodies (Figs. 37, 39, 41), invagination (Figs. 56, 57), prolapsus ani (Fig. 69), multiple polyps (Fig. 74), cryptitis (Fig. 50), inflamed or enlarged anal papillæ (Fig. 5), congenital malformations (Figs. 20–24), deformities of the coccyx (Figs. 66–68), rectocele (Figs. 47, 49), fibrous degeneration of the sphincter, and extensive pelvic and perirectal fistulæ (Fig. 75), complicated by marked inflammatory exudates.

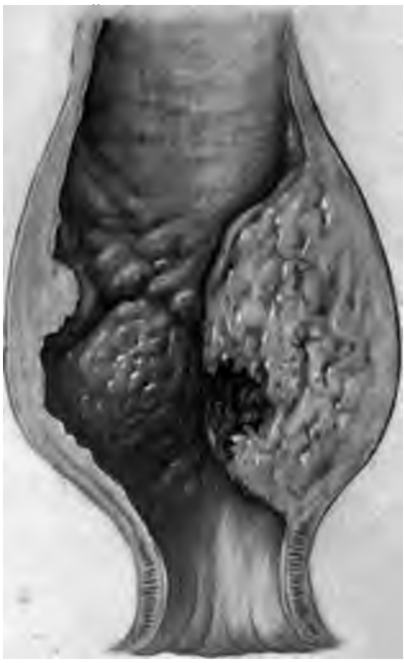

Fig. 73.—Cylindric-celled carcinoma of the rectum, the mass on the left showing a characteristic crater-like ulcer (after author's case).

In this connection it is well to remember that constipation may not only be caused by affections of the lower bowel, but that it may also be induced by displacements of, or disease in, neighboring organs, such as the uterus, vagina, bladder, prostate, and urethra, when of

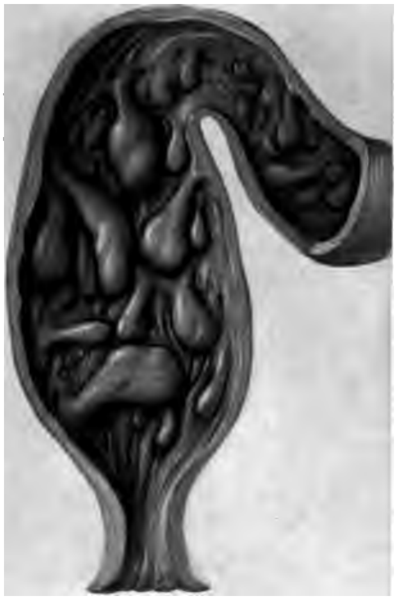

Fig. 74.—Rectocolonic polyps (after author's case). This patient declined excision and was relieved by high colostomy.

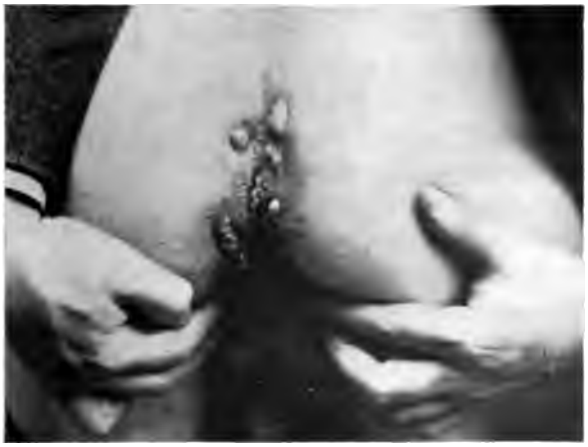

Fig. 75.—Fibromata and multiple fistulæ about the anorectal region (author's case).

sufficient severity to press on the rectum, encroach upon its lumen, or in other ways interfere with its functions.

CHAPTER X

SYMPTOMS AND CONSEQUENCES OF CONSTIPATION

General Remarks.—Because of the numerous manifestations and disturbances which have been attributed to constipation, it would be impossible in a work of this scope to discuss them all separately and in detail.

The symptoms, local and general, consequent upon constipation vary greatly in different cases, depending upon the temperament of the subject, the cause of the costiveness, its duration, and the condition of the bowel as regards fecal impaction when the patient is seen for the first time. For the above reasons it is impossible to name symptoms which would fit every case; hence, I will mention and discuss only those manifestations which are likely to be encountered most frequently in the handling of a large number of cases of chronic constipation.

After having discussed the symptomatology of constipation in a general way, I will discuss separately and more fully those symptoms which because of their prominence require separate consideration; and will then point out the special manifestations caused by the abnormal accumulation and retention of fecal matter in the different parts of the colon and rectum.

The character of the feces may vary in amount, consistence, and contour, both in health and disease. The quantity of the excrement evacuated is greater when vegetables predominate in the diet than when a considerable quantity of meat is eaten, and the evacuations are also larger after drinking water in abundance than when a small amount of liquid is consumed.

Again, when the feces are unduly retained in the bowel the watery portion is absorbed, and the remainder is evacuated as large, compact, cylinder-like pieces, the lower end of which is firm and irregular, or there may be round, hard balls (scybala), varying from a marble to a hen's egg in size, either alone or massed together.

Although the patient may have a stool daily, he not infrequently assumes that he is suffering from constipation when such is not the case, simply because he is misled by the evacuations being more irregular in shape, smaller, or harder than formerly.

No one has as yet been able to give a satisfactory explanation of why it is that one constipated individual will suffer from most distressing symptoms, local and systemic, caused by retained feces of one or two days' standing; while another person suffers no inconvenience and appears to be pretty well, although he has not had an evacuation for several days, weeks, or months.

I have treated both types of costiveness many times, studying them side by side, and have been unable to arrive at any satisfactory explanation, unless it be that it is due to an idiosyncrasy of the patient, or that the mucosa is denuded in the one case and not in the other, which permits the deleterious elements of the feces to find their way into the circulation, or that the emunctories perform their duties more effectively in the one than in the other. But it must be borne in mind that the costiveness is only the one factor, the other is the individual's constitution, and especially the irritability of his nervous system. A cup of coffee in the evening will cause a sleepless night for the one, while the same amount of coffee for another will not have any effect at all.

I have recently had under my care 2 most interesting cases of constipation with coprostasis of months' standing. One was a boy of eleven and the other a girl eighteen years of age, neither of whom, according to their history, had in recent years more than two movements during twelve months; and then the evacuations were obtained with great difficulty. In both instances it was necessary to commit the patient to the hospital and administer large amounts of oil and other cathartics by mouth, to inject copious quantities of oil into the colon, and to flush it out with soap-suds for days before the fecal accumulations were evacuated. The stools, when eventually secured, were considerable in quantity, but not nearly so much as one would expect under the circumstances. Neither of these patients complained of discomfort other than tenderness on pressure over the colon; nor did they develop systemic disturbances, and they looked to be in perfect health. In these cases the noticeable indications of retained feces were the dilated bowel, pendulous belly, and cloudy urine, and I was unable to assign a cause for the condition other than atony of the intestine or hysteria.

I could cite other similar cases, due to obstructive constipation, where the feces were retained from six weeks to four months, causing but slight disturbance to the patient, but I will refrain from doing so, as it would only be a repetition of what has already been said.

This type of constipation or, more properly, *coprostasis*, should be regarded as exceptional, for the reason that the accumulation and retention of so large a collection of the excrement for so long a time would in the average individual cause both painful local manifestations and profound systemic disturbances.

The most important symptom of constipation from the patient's standpoint is that the bowel does not act properly, the evacuations being either too far apart, or too small in amount, or they are of improper shape, or too hard in consistence. As a result he fears that this real or supposedly unnatural condition will result in much harm. In some cases the anxiety regarding the stools in constipated subjects is well founded, but in most instances the mental disturbance consequent upon delayed or insufficient evacuations is grossly out of proportion to the damage done by their retention for a reasonable period.

The mind has a powerful influence for good or bad upon the act of defecation. Consequently, persons who permit themselves to become greatly worried and excited because they do not have an action when they think they should, or because the amount, consistence, or shape of the stool is not up to their standard, aggravate their condition by working themselves into such a nervous state that they are unable to concentrate the mind, and in this way assist in the act of defecation, when the time for the expulsion of the feces has arrived.

The uncivilized races and persons who labor constantly for their livelihood suffer less frequently from constipation than do the highly civilized nations and wealthy persons of the leisure class. This is partly attributable to the fact that the highly educated and the unoccupied are apt to worry about the daily stool more frequently and unnecessarily than do the ignorant and persons in less easy circumstances.

Some individuals complain of being constipated year in and year out, while others have intermittent attacks, lasting for a few days or weeks, the movements at other times being normal, both as regards their size and frequency.

There is a form of costiveness known as *fragmentary constipation*, a condition frequently improperly diagnosed. In this class of cases the patient has a number of small evacuations in twenty-four hours, but the total amount of excrement is much below what the daily output should be, and as a consequence the feces gradually accumulate in quantities sufficient to induce the local and systemic manifestations which accompany sluggishness of the bowel.

Besides irregularity and incompleteness of the stools, the following symptoms, local, systemic, and reflex, have been attributed to constipation by different authorities at various times: *Vertigo, flashes before* *the eyes, frontal headache, neuralgia, neuritis, insomnia; bad dreams; loss of memory; inability to concentrate the mind; disinclination for business and social engagements; petulant disposition; anxiety; hysteria; hypochondriasis; despondency and melancholia; neurasthenia; temporary mania; infantile convulsions*, and other *nervous phenomena.*

Patients suffering from obstinate constipation not infrequently suffer from *furred tongue; bad taste in the mouth; foul breath; nausea; thirst; indifferent appetite; gaseous eructations; flatulence; abdominal tenderness; colicky pains; cold extremities; sallow complexion; fecal fever; small weak pulse; anemia; palpitation; albuminuria; lithemia; frequent micturition; dark-colored urine; indicanuria and increase of the solid constituents in the urine; skin affections.*

Constipation complicated by fecal retention of sufficient magnitude may, owing to the pressure and irritation caused by the feces, produce local disturbances such as *diarrhea; intestinal catarrh; discharges of mucus, alone* or *admixed with pus and blood; ulceration; enteroptosis; dilatation of the bowel; localized peritonitis; adhesions and tumefactions; localized pain*, and *disturbances* and *diseases* of the *bladder, urethra, prostate, seminal vesicles, uterus, tubes*, and *ovaries*—conditions which will be more fully discussed a little further on.

In addition to the symptoms enumerated, constipated subjects not infrequently complain of *pain* or *sensations* of *fulness* and *discomfort* in some particular part or over the entire abdomen. This may be the result of distention due to large accumulations of gas or its retention by a fecal mass; or to local tenderness or pulling pains induced by fecal accumulations which drag the bowel downward.

That disturbances arising from chronic constipation and fecal impaction may be both numerous and serious, and manifest themselves as purely *local conditions*, or as *reflex disturbances*, in parts far removed from the overloaded intestine, either through injury to the gut itself or to adjacent nerves, blood-vessels, or neighboring organs, is a fact easily verified by the observing clinician.

I have many times observed the following conditions which appear to be the result of costiveness and chronically retained fecal accumulations: *Enteroptosis, angulation, dilatation*, and *displacement* of the bowel, *congestion, irritation*, and other *diseases* and *disturbances* of the *uterus, ovaries*, and *tubes, menorrhagia, vesical, prostatic*, and *urethral disturbances, neuralgias* of the buttocks, sacrococcygeal region, and limbs, *cold extremities, seminal emissions*, and *hemorrhoids*, caused by the injury to or blocking of the iliac, hemorrdoidal, and pudic veins, as well as congestion, erosions, and ulcerations induced by irritation and pressure upon the intestinal mucosa and its blood-vessels by the accumulated feces.

Having thus far discussed the manifestations of constipation in a cursory way only, it now remains for me to consider at greater length some of the symptoms, which because of their frequency and importance are deserving of a more comprehensive study.

Nervous Disturbances.—There has been a great deal of controversy recently regarding the rôle played by constipation and coprostasis in causing certain disturbances of the nervous system, and also as to the influence of some nervous diseases upon the origin of constipation. These arguments *pro* and *con* have not settled the points at issue, because no one has been able to draw the dividing line and demonstrate which nervous affections are consequent upon constipation; nor, on the other hand, has anyone succeeded in showing how the costiveness so frequently encountered in connection with certain nervous affections is traceable to defects in the nervous mechanism.

Clinicians generally admit the frequent coëxistence of constipation and nervous disturbances in the same individual. I have given this subject considerable attention and do not hesitate to state my belief that costiveness may precede and cause nervous manifestations in one instance, while in another the nervous derangement develops first, and in some direct or unknown way may at a later date give rise to constipation.

However, the important thing to remember is that when either of these two conditions is present and the other develops, the patient's condition is made more deplorable, for the reason that each aggravates the other, thereby establishing a *vicious circle.*

Certainly constipation becomes more difficult to handle when permitted to go unrelieved, until it is thus complicated by some serious disturbance of the nervous system; and this is equally true when nervous affections are improperly treated and patients are permitted, in ignorance or indifference, to contract habitual constipation through neglect of the hygiene of the bowel.

It is not difficult to understand how constipation may result from hysteria, neurasthenia, myelitis, basilar meningitis, tetanus, multiple sclerosis, and paralytic conditions involving the brain, cord, and nerve-centers, which exert an inhibiting or paralyzing influence upon the nerves controlling the intestine and the act of defecation; nor does it require much thought to comprehend how insomnia, restlessness, hysteria, melancholia, and nervous manifestations, such as impatience, irascibility, petulance, or oversensitiveness to sound can be caused by constipation. Many authorities have attempted to explain the nervous phenomena accompanying constipation on the ground of intestinal *auto-intoxication*, a feature of the subject which will be considered by me a little further on.

Unfortunately, many individuals in some unaccountable way convince themselves that their health and happiness is dependent entirely upon a daily evacuation, which, according to their standard, should take place at a set time and which should not vary either in amount, consistence, or shape. Such persons, especially when they are of a nervous temperament, immediately begin to worry if the daily evacuation is delayed or is smaller or harder than they think it should be; and, on the other hand, they are as happy as a child with a new toy when the stools come in regular order and are of the proper proportions.

Persons of wealth and leisure who are constipated develop nervous phenomena more frequently than do working people similarly afflicted, simply because they have an abundance of time to dwell upon their real or supposed ills. I have frequently treated highly educated and refined persons of both sexes who, when they did not have their "morning evacuation," would worry until they were all in a tremble and totally unfit to keep their social or business engagements. Such individuals through their anxiety aggravate their condition and, in consequence, become the victims of habitual constipation. As time passes and they obtain no relief, their mental state, through worry, becomes more pitiablé. They think and talk of nothing but their constipated condition, and as a result of this undue anxiety they neglect their business, withdraw from social life, are gloomy and disagreeable, nothing seeming to please them, and finally they suffer from insomnia, hysteria, and despondency, believing that their complaint is incurable.

I have more than once seen conditions verging on temporary insanity caused by constipation, through auto-intoxication in some instances, and in others the result of needless mental anxiety, induced by the fact that the bowel did not act as it should.

Some enthusiastic writers upon constipation and coprostasis hold that a large percentage of the cases of hypochrondriasis, chorea, epilepsy, neurasthenia, convulsions, and sometimes incurable insanity are traceable to costiveness—views which I do not share. I do believe, however, that such nervous disorders are frequently aggravated by habitual constipation, and can be greatly improved by seeing to it that the bowel does not become clogged with feces.

Auto-intoxication, or self-poisoning from the intestinal canal, have ideal conditions favoring intestinal auto-intoxication; that is, a stagnant mass, with liquid feces and the secretions of the mucosa around it, forming a good culture-medium for myriads of bacteria, and the excoriated mucosa affording toxins of all kinds free entrance into the circulation, which may carry them to any point of the system.

It is a notable fact that in mechanical constipation, which is quite common, the stools may be like scybala at one time and liquid or soft at another. This is especially noticeable in strictured conditions of the bowel.

In answer to the fourth argument, I may say that I have seen the neurotic symptoms persist after constipation had been cured, but these exceptional cases were characterized by some other ailment of sufficient gravity to account for the clinical picture. On the other hand, this argument does not seem to be a strong one if we consider that post-toxic effects do not necessarily subside with the disappearance of the toxins. A postdiphtheric paralysis of a certain nerve is not relieved even after the diphtheria is entirely cured, and the same remark applies to nerve-paralysis from lead-poisoning.

In chronic constipation of several years' standing it requires a considerable time to establish the equilibrium and restore the patient to perfect health, even after the regularity of the stools has been instituted. My experience in the treatment of a very large number of persons suffering from constipation has been so satisfactory as regards improvement in their general condition, following the correction of the constipated state, that I am forced to believe that there is such a thing as self-poisoning from the intestinal canal in this class of cases.

There are many clinical facts which can be cited in support of the theory, as seen from the following:

Surgeons and obstetricians have learned from experience that when a patient has a sudden rise of temperature, which cannot be accounted for on the ground of infection, the best thing to do is to administer a cathartic or high enema and thoroughly empty the bowel—a procedure which is generally followed by a prompt reduction in the temperature, pointing to the fact that fecal retention and absorption of noxious products were at the bottom of the trouble.

Fecal retention is accompanied by an increased indicanuria. Cleansing of the bowel by lavage is immediately followed by a diminution of this urinary constituent.

A further evidence of intestinal toxicosis pointed out by Bouchard is that the toxicity of the urine rapidly decreases when iodoform, naphthalin, or other intestinal antiseptics are administered.

Clinicians are generally agreed that infantile convulsions can be arrested by paying proper attention to the hygiene of the bowel, and that the condition of persons suffering from insanity or from organic diseases of the nervous system is nearly always improved by securing a regular daily evacuation—facts which go to show that auto-intoxication, while perhaps not the cause of the disease, has at least an aggravating effect upon it.

Another evidence of intestinal toxemia is found in the fact that persons having a dilatation of the colon suffer from frequent attacks of vertigo, headaches, and other nervous phenomena, which are promptly relieved by copious lavage. It is also well to remember that there is an unquestionable source for toxic substances in cases of dilatation of the stomach in the retained and decaying food residues, causing a typical autotoxicosis ("tetany").

Again, it has been frequently observed that the foul odor of the skin which accompanies chronic fecal impaction and the pigmentation and other cutaneous pathologic conditions promptly disappear when this underlying trouble has been cured; and the same thing can be said in regard to anemia which accompanies the constipated state.

Complete intestinal obstruction in the first days is accompanied by local pain and distention, but in the later stages the patient suffers from vomiting, clammy perspiration, cold extremities, collapse, and other manifestations indicating absorption from the secretions, retained excrement, and virulent bacterial poisons. The majority of surgeons of a wide experience have lost patients a few days after an obstruction had been relieved, death being presumably the result of the pouring into the intestine below it of the enormous amount of toxic material which had accumulated above the point of occlusion. On the other hand, when a temporary opening is made in the bowel and it is flushed out, such dire results do not occur.

This picture represents what may happen in complete occlusion, and there is considerable clinical evidence to support the belief that auto-intoxication may result from those less severe types of mechanical obstruction which are not dangerous to life, but which materially interfere with the free passage of the fecal current, thus favoring recurrent fecal impaction and absorption.

Finally, it has been my experience in a large number of cases that when the constipation has been cured, a marked improvement in the general condition follows. Hence, it would appear, at least from a clinical standpoint, that the toxins elaborated within the intestine in this class of cases find their way into the system, and either cause or aggravate the many nervous and other phenomena elsewhere enumerated. It matters little from a clinical point of view whether we designate the condition responsible for such pernicious results as auto-intoxication, intestinal toxicosis, or copremia. I do not believe that everyone who is constipated suffers from intestinal toxicosis, because I have treated many persons who complained of nothing further than that their evacuations were too hard, too small in amount, or too far apart. Patients of this latter type are usually robust, industrious, well nourished, of regular habits, and lead an outdoor life. On the other hand, I have observed that constipation accompanied by auto-intoxication is more frequent and pronounced in patients who lead a sedentary, indolent, or dissipated life, whose surroundings are unhygienic, or who suffer from chronic invalidism or deficient nutrition from some cause or other, or impairment of one or more of the emunctories.

The credit for the improvement in the patient's nervous condition following the cure of constipation should not be invariably ascribed to the relief of the intestinal auto-intoxication, for such is not always the case. Many constipated persons convince themselves that their health depends mainly upon the amount and regularity of the stools, and they become morbid when the evacuations do not meet their arbitrary standard of quantity and frequency. Hence the nervous symptoms of this class of constipated subjects show a marked improvement immediately following the cure of their constipation. They take a new grip on life, gain in weight, and once more take an active interest in their surroundings.

Of course, the final proofs for the reality of auto-intoxication will very probably be furnished by experimental research, but until this is done, I hold that the observing clinician is a much better judge than the man in the laboratory. When we observe in countless cases the deleterious effects of constipation disappearing sometimes in a very short time, and returning as soon as the treatment is interrupted, we hold ourselves justified in interpreting this fact as a biologic proof for the presence of toxins with strong affinity for the nervous system, elaborated and absorbed in the intestines.

Colitis (sigmoiditis and perisigmoiditis) is a frequent complication of constipation, and may occur independently or be caused by the constipated state in cases where the stools are far apart and fecal impaction is of frequent occurrence. In such instances the traumatism to the mucosa is sufficient to start up and prolong the inflammation, which may or may not be accompanied by ulceration and enterospasm.

Auto-intoxication is more marked in this type of costiveness, and the patient complains of uncomfortable sensations and pains in the lower and central part of the abdomen just prior to the evacuation of considerable quantities of stringy, jelly-like, or tubular casts of mucus. In ulcerative colitis the stools contain pus and blood and have a highly offensive odor.

Diarrhea.—In studying the symptomatology of chronic constipation, it is well to bear in mind that *diarrhea* is a frequent manifestation of this condition, especially when it is complicated at more or less frequent intervals by fecal impaction. Diarrhea consequent upon fecal accumulation in different parts of the colon and rectum may be accounted for in various ways. In one instance, frequent fluid fecal evacuations are the result of interference with gastric and intestinal digestion secondary to reflex disturbances induced by violent efforts of the bowel to expel the offending mass or masses. In another group of cases, the frequent stools are due to prolonged peristalsis and increased secretion of mucus, excited by the continued injury and irritation of the mucosa by the retained excrement. Again, it is held by some that fecal retention favors the generation of poisons within the gut in quantities sufficient to set up irritation or in some other way cause fluid evacuations.

Diarrhea is a common symptom of carcinoma, stricture, and most forms of chronic intestinal obstruction, due to the fact that the retained feces, the mucous and serous discharge, eventually mixed with blood, give rise to abnormal putrefaction, which in turn irritates the mucous membrane and increases the stream of fluids into the gut. When a fecal mass is present, it not only acts as a foreign body and excites abnormal peristalsis, but it sometimes, by its up-and-down movements, acts as a valve, shutting off the fecal current, permitting at one time the escape of a considerable amount of fluid feces, while at another only a few drops or, at best, a small quantity is permitted to get by. In rare instances the mass may be grooved on one side or channeled through the center, permitting the feces to be discharged less often and in semisolid shape, frequently with fluid, depending upon the size of the tunnel or outlet. In cases of considerable standing, where a large mass is located in the rectum, the sphincter becomes worn out through the prolonged irritation kept up by the mass, and allows constant dribbling of the fluid feces from the anus. The discharges are dark in color and of an extremely *fetid odor.*

In cases of coprostasis complicated by diarrhea the attending physician not infrequently prescribes remedies such as bismuth, opium, and chalk, with the object of arresting the diarrhea, when castor oil or colonic flushings are indicated to dissolve and dislodge the retained feces and cause them to be evacuated.

Skin Affections.—The majority of female patients seeking relief from constipation do so in order to improve their complexion or obtain a cure for some facial blemish or skin disease, which they attribute to their constipated condition. Many of these sufferers know from past experience that their complexion is not so good during and following attacks of constipation as at other times.

Some authorities lay a great deal of stress upon the deleterious effects of constipation upon the skin, and maintain that acne, pruritus, urticaria, boils, erythema, pemphigus, impetigo, and a number of others are not infrequently traceable to this condition, while others go to the opposite extreme and hold that the above affections never result from costiveness. I do not believe that constipation is responsible for many of the more serious skin affections named above, but I do believe that it is very often the cause of the dirty and muddy complexion so frequently observed in constipated subjects; and sometimes is either directly or indirectly responsible for the small pimples seen upon the face.

The most frequent markings of the skin observed by me in persons suffering from costiveness are what are known as *blotches.* These blotches appear suddenly, are of a dirty brown color, irregular in shape, noticeable at a distance, and vary from split-pea size to that of a half-dollar. They are usually located upon the eyelids, cheeks, temples, and neck, and are a source of worry and anxiety because of the disfigurement they produce. In addition to the skin manifestations just described consequent upon costiveness, the skin in persons suffering from habitual constipation sometimes gives off an exceedingly nauseating odor. The best proof that constipation has a baleful influence upon the skin in some instances is the fact that these affections of the skin permanently disappear when the constipation has been cured.

Headache.—One of the most common, annoying, and persistent symptoms of costiveness is pain in the head. Headaches from constipation vary in different cases, dependent upon the temperament of the individual and the state of the bowel. Constipated persons of a highly nervous temperament suffer more frequently and severely from cephalalgia than do less nervous individuals, and the headache is more severe and lasts longer when the evacuations have been delayed for several days than it is when the fecal retention is of short duration. Attacks of headache, aggravated by habitual constipation, may occur almost daily or at rare intervals, and may last only a few moments in one case, while in another the pain may continue for several hours or days. The suffering may manifest itself as a sensation of fulness and discomfort in the head or as an unbearable, agonizing, beating, or throbbing pain, located over one eye, in the forehead, temples, or occipital region.

Of the varying forms of headache which may complicate constipation, that known as *sick headache* is the most distressing.

Sick headache differs from the *ordinary* in that it is most common among women, comes on suddenly upon rising in the morning, and is followed a few hours later by nausea, vomiting, and throwing off of bile.

The pain is most severe over the eyes or in the temples, and is aggravated and intensified by the vomiting and straining which results. During the attacks the stomach is in an extremely irritable state, and for hours at a time will retain nothing, with possibly the exception of hot water. Sick headache usually persists for twenty-four hours or longer and does not subside, as a rule, until the stomach has been quieted sufficiently to retain a cathartic; which, in order to be successful, must serve the double purpose of stimulating the liver and cleansing the bowel of the retained excrement. Emptying of the bowel will, in most instances, be followed shortly by a cessation of the pain in the head.

The attacks of sick headache in constipated subjects occur periodically, from four to six weeks apart, and in some instances they disappear altogether when the constipation has been permanently relieved.

Neuralgia is either a symptom of constipation or it is a very frequent complication of this condition. Some authorities maintain that the nerve-ache, so persistently encountered in constipated individuals, is not the result of the costive state, but that it has an independent cause. I have not the slightest doubt that in some cases this is true, but in many others I am firmly convinced that neuralgia is secondary to, and consequent upon, the constipation. I feel confident that my premises are correct, for the reason that I have time and time again succeeded in relieving and preventing periodic attacks in costive individuals simply by attending to the proper hygiene of the bowel, and in this way preventing the abnormal retention of the excrement. Occasionally, patients who for years have been suffering from sciatica resisting numerous methods of treatment (electric, hydropathic, osteopathic, etc.), can be promptly relieved as soon as the coëxisting and often overlooked habitual constipation is properly treated.

The nerve-ache consequent upon constipation is probably due to direct pressure of the fecal mass upon a nerve, giving rise to local and reflex neuralgic pains; or to a neuritis the result of traumatism, or to a morbid and exalted state of the sensory nerves or their centers, induced by auto-intoxication or the impoverished condition of the blood.

Loomis, of New York, once said that neuralgia is simply "a cry of the nerves for better blood."

Fecal accumulations within the colon and sigmoid flexure may induce neuralgia in almost any part of the abdomen, and such pains are often misleading to patients, who believe that there is some serious affection of the stomach, intestine, uterus, ovaries, tubes, bladder, or other organs. When an impaction is situated in the rectum and is large enough to press upon the sacral plexus and neighboring nerves, it will induce neuralgic pains in the sacrococcygeal region or in the bladder, prostate, or scrotum. In constipated individuals, as has been already stated, neuralgias of the face and head are of frequent occurrence.

Abdominal Pain.—Pain in different parts of the abdomen is a frequent manifestation of constipation, and may vary from a slight discomfort to the most intense suffering. In one instance there will be simply tenderness on moving about or from pressure, while another individual may suffer from attacks of pain short in duration or continued for several hours. Sometimes the attacks may occur only once in several weeks, at others they may occur daily or several times during the day.

Colic and *distention pains* are most frequent and distressing, and result from the formation of large amounts of gas or its retention by a fecal mass, or mechanical obstruction, or they may be induced by cramping or enterospasm, when, as the result of irritation or other causes, the circular and longitudinal muscular fibers of the gut are excited to simultaneous contraction.

Colicky pains usually manifest themselves in the central part of the abdomen, though occasionally they are extremely difficult to locate. They occur suddenly, are agonizing in character, and induce so much suffering that it is impossible for the patient to obtain relief, no matter what position he may assume. When the pain continues for a considerable time the sufferer becomes restless, pale, exhausted, breaks out in a cold perspiration; and if not now promptly relieved the condition goes on to vomiting, hiccough, and finally complete collapse. Usually immediate relief follows an evacuation of the bowel, which permits the contained gas and retained feces to escape. After such severe attacks the entire abdominal region for the next few days is sore and very tender to the touch.

When the attack is due to enterospasm, the pain is usually referable to the segment of the gut involved in the contraction. Distention pains may be induced by either gas or feces when present in quantities sufficient to dilate the bowel. In the severer cases the abdominal muscles may be found rigid and in a state of tetanic contraction. The stiffening is sometimes limited to one side of the abdomen, the muscle "on guard" pointing to the seat of the disturbance.

Flatulence is an exceedingly common manifestation of constipation, and in consequence the accumulated gases may induce embarrassing noises (meteorism) in the abdomen, or aching or sinking pains in the lower abdomen, similar to those felt just prior to the evacuation of a fluid stool during a sudden diarrheal attack. In some cases distention of the gut with gas may be marked, and yet cause but little discomfort, while a slight distention in others causes great pain. From this it would seem that the irritating qualities of some forms of gas cause more pain than do others.

CHAPTER XI

SYMPTOMS OF MECHANICAL (OBSTRUCTIVE) CONSTIPATION

THE symptoms of mechanical constipation or obstipation depend principally on its cause, duration, and the degree of obstruction to the bowel induced by it. When the obstruction is almost complete, acute obstipation ensues; and when it is less marked, chronic obstructive constipation results. The symptoms of the former type of obstruction are more violent and dangerous than the latter, which develops more slowly and rarely completely blocks the bowel. In the **acute** form, cathartics usually prove ineffectual; and high enemata in the beginning of the attack, while serving to bring away a small amount of feces, later on are returned clear. Persons suffering from acute obstruction frequently have a desire to evacuate the bowel, but pass nothing but mucus. This type of costiveness is most common in childhood, is of sudden onset, and is characterized by continuous pain located in the central part of the abdomen, which is not diminished by a change of position. Unless promptly relieved the patient becomes restless, breaks out in a cold perspiration, has hiccough, is nauseated, and vomits first stomach-contents, then bile, and, finally, fecal matter. The gravity of his condition is indicated by his furred tongue, facial expression of distress, weak, thready pulse, subnormal temperature, and labored respiration; the abdomen is distended and tender on pressure, there is violent peristalsis, and the movements of the bowel may be seen when the abdominal wall is thin or determined by palpation when thick. If the obstruction is not now quickly removed the patient soon dies from exhaustion, intestinal toxemia, or septic peritonitis, following perforation or gangrene of the bowel.

After recovery from an attack of acute mechanical obstruction patients frequently suffer from chronic constipation as a result of the paralyzed state of the intestine, resulting from prolonged distention.

Chronic mechanical constipation (obstipation) is of common occurrence, and is encountered more frequently in adults than in children, and in women than in men.

The systemic manifestations of chronic obstipation are similar in many ways to those of costiveness resulting from atony, improper diet, irregular habits, etc., but the local disturbances vary in different cases with the nature of the obstruction.

Chronic obstructive constipation may be preceded by peritonitis, appendicitis, typhoid fever, pelvic inflammation, or a surgical operation; most frequently, however, such is not the case.

Except in congenital cases, the patient usually has enjoyed good health until the bowel began acting queerly, the stools became too far apart, too small, or abnormal in shape and consistence. In this type of costiveness, the character of the evacuations and local manifestations depend greatly upon the part of the bowel involved and the nature of the obstruction. In one case constipation is continuous and artificial measures are required daily, year in and year out, to secure the necessary stools; while in another, the costiveness is *intermittent* and there are periods between the attacks when the bowel moves naturally. Constipation is more obstinate when the obstruction is located in the sigmoid flexure and rectum than when it is in the small intestine or upper colon. When in the small bowel the feces, owing to their liquid state, find their way past it, and are enabled to escape into the large bowel and eventually be discharged regularly, having the appearance of a normal stool. But when the sigmoid flexure or rectum is involved the evacuations may be liquid or semisolid in consistence, or the feces may be discharged as small or large nodular masses, ribbon-shaped, pipe-stem-like, or grooved cylinders, depending upon the nature of the obstruction.

The symptomatology of chronic constipation induced by *congenital deformities*, *extra-intestinal pressure*, *bands*, *adhesions*, and *tumefactions*, *abnormal mesentery*, *volvulus*, *angulations*, and *hernia* is similar in many respects. Without previous warning the bowel begins to act irregularly and the stools become further apart than formerly. At first a daily stool can be secured by the aid of fruit, a special diet, and exercise. After a further time, constipation becomes more obstinate and mild laxatives are required to obtain a satisfactory movement, and still later, frequent copious enemata or exceedingly strong cathartics are necessary to secure the coveted evacuation and avoid fecal impaction. When unrelieved, the obstruction becomes more marked and the costiveness more aggravated, or commences to alternate with diarrhea, and manifestations of auto-intoxication appear. Finally, when the lumen of the gut is almost completely closed, considerable mucosa is excoriated, the colon above the obstructed point becomes dilated, and diarrhea prevails, for the reason that only liquid feces can find their way past the obstruction. Solid fecal matter accumulates above the constriction, exciting peristalsis, and keeping the bowel in a constant state of irritation.

Some patients suffering from obstipation may at one time require the strongest cathartics, while at another the bowel acts almost, if not quite, normally. This peculiarity may be accounted for by the relief of the bowel following the change in position of a tumor or organ pressing upon it, or by the straightening out or unwinding of a piece of gut which had been angulated or twisted; or, again, by the temporary subsidence of any irritation which had excited the intestinal musculature to frequent spasmodic contractions (enterospasm).

Patients suffering from chronic constipation induced by the mechanical causes named above sooner or later complain of disturbed digestion, meteorism, sensations of weight and fulness over the course of the colon, mild or agonizing colicky pains, pulling pains when due to adhesions, headache, and various nervous phenomena.

Intestinal stricture produces varying symptoms, depending upon the degree of constriction and the part of the bowel involved.

Stenosis of the small intestine does not occur often, rarely produces obstinate constipation, violent peristalsis, intestinal stiffening, and the colicky pains so frequently witnessed in persons suffering from constriction of the colon or rectum. Again, in stricture of the small bowel, the patient complains of gastric distention, digestive disturbances, nausea, and vomiting as a result of the backing up of the chyme contained in the gut above the constriction, and this condition soon leads to malnutrition and emaciation. When the lower ileum is involved, obstipation is unlikely to occur, because the fluidity of the feces enables them to pass the constriction and to be discharged almost, if not entirely, normal in consistence and form.

Stricture of the large bowel is fairly common, and is encountered more frequently in women than in men, and oftener in patients over forty than at a more youthful age.

In its incipiency, colonic stricture produces slight disturbances in the abdomen, which the sufferer finds it difficult to locate. Soon constipation begins to play an important rôle, for the evacuations become irregular or delayed, and the bowel does not empty itself until it is stimulated to action by the eating of fruit, the drinking of water, and the taking of exercise. Shortly, mild laxatives must be used to secure the desired daily evacuation, and after a further time, strong cathartics, purgatives, or enemata of oil or soap-suds are required to enable the patient to keep his bowels open, and, finally, when the constriction becomes quite tight, constipation begins to alternate with diarrhea, and it becomes necessary for the sufferer to resort to almost continual catharsis or irrigation in order to keep the bowel free and prevent fecal impaction.

When once a stricture of the colon or sigmoid flexure is fully developed, the patients not only suffer from obstinate constipation and diarrheal attacks, but also from poor appetite, irritable stomach, gas pains, sallow complexion, blotches on the skin, loss of weight, headaches, nervousness, mental lassitude, neuralgias, and other manifestations consequent upon the copremia arising from the retained fecal accumulations. Again, they frequently complain of distention from gas, abdominal soreness, local pain on pressure, and sensations of weight and fulness on the side and in the immediate neighborhood of the stricture, and at times from violent peristalsis discernible by inspection on palpation, intestinal rigidity, and often recurring attacks of spasmodic pains, agonizing in character, which may persist from a few moments to several hours, completely exhausting the sufferers.

Again, colonic and sigmoidal stricture of any consequence is invariably complicated by recurring fecal impactions, colitis, and ulceration, which constantly keep the gut in an inflamed and irritable condition. There are frequent discharges of mucus, pus, and blood, alone or admixed, and sometimes the mobility of the bowel is restricted because of the extension of the inflammatory process to the peritoneum and the binding of the gut to the adjoining structures.

Finally, the patient will, in most instances, be able to point out some particular spot along the course of the colon where, according to his or her opinion, the feces are arrested in their downward course.

Stenosis of the rectum and lower sigmoid flexure is accompanied by nearly if not all of the symptoms which characterize narrowing of the colon as enumerated above, and also by manifestations peculiar to stricture in this region.

Patients suffering from rectal stricture complain of obstinate constipation, which may be persistent or alternate with diarrhea. There is incessant desire to empty the bowel, and it matters not for how long a time they may try to empty it, how much they may strain, or how many evacuations they may have, there is still a sensation of something remaining in the rectum which should be expelled. Owing to the pressure caused by stricture or accumulated feces above it, there is almost constant tenesmus, bearing-down pains in the rectum, and reflected pain felt in neighboring organs, the sacrococcygeal region, and down the limbs. These patients have a waxy complexion, furred tongue, pinched expression, suffer pain from indigestion, and are much emaciated.

In cases of stricture, where there is only a slight or moderate degree of stenosis, constipation is less obstinate and the character of the evacuations varies but little from the normal. When the constriction is pronounced, on the contrary, it is extremely difficult to prevent fecal accumulation, and when the bowels move the excrement is either fluid or semisolid in consistence, or else may appear in flat tape-like strings or pipe-stem-shaped or grooved pieces, depending upon the size and shape of the opening through which it has passed.

Usually ulceration is more marked in stricture of the lower bowel, and the stools always contain a considerable amount of the foul-smelling discharge, made up of retained mucus, pus, and blood. When the evacuations contain clotted blood resembling coffee-grounds, it is quite probable that there is an ulceration higher up in the colon. When from the rectum, the blood is discharged fresh, unclotted, and bright red in color.

In nearly all cases of stenosis in the lower part of the gut the patient suffers from incontinence, owing to the destruction of the muscle by disease, or because it has become patulous through overwork from constant tenesmus. In consequence of the relaxed condition of the anus which ensues, the fluid feces and irritating discharges constantly dribble through it, and keep the skin about the anus irritated, setting up an inflammatory condition, which results in pruritus and the formation of skin tags.

Enterospasm is a simultaneous contraction of both muscular coats, excited by some irritation (such as collections of mucus), situated within or without the bowel. It is of sudden onset and the attacks may endure from a few moments to several hours or days, with partial or complete occlusion of the gut. Constipation is always a pronounced manifestation of this condition, and may be intermittent or continuous, depending upon the length of time which elapses between the attacks. While the bowel is so contracted it can be felt through the abdominal wall as a hard-knotted or small ridge-like tube. The patient suffers from distention and the most agonizing cramping pains, constant rumbling sounds in the bowel, and it is sometimes impossible to secure an evacuation, no matter what means be adopted. After an attack the patient suffers from abdominal soreness for two or three days.

Intestinal Parasites (Worms).—Subjective and objective symptoms, aside from irregular action of the bowel, are entirely absent in certain cases, whereas other patients complain of distressing crawling sensations in the abdomen, cramps and colics, itching of the anus and the nose, digestive disturbances, anorexia alternating with bulimia, bad sleep, and extreme nervousness.

Benign and malignant neoplasms of the intestine induce about the same manifestations as do strictures from other causes, no matter whether they are situated in the colon or in the rectum; besides these symptoms, cancer patients suffer from cachexia, enlarged glands, involvement of other organs, a more rapid loss of flesh, more severe pain, and the stools have a characteristic nauseating odor, and contain not only pus, blood, and mucus, but occasionally dark pigment or shreds of tissue.

The symptoms of obstipation induced by **foreign bodies** (**enteroliths**) and **fecal impaction** are almost identical. The manifestations caused by them are more numerous and distressing when the foreign bodies or fecal accumulations are multiple, large, and irregular, and when they are situated at a narrow or angulated portion of the gut than when they are single, small, smooth, and located in the free intestine.

In the beginning there is persistent constipation, alternating later on with diarrhea, and when the bowel becomes blocked by the impacted mass or stone, around which the feces have collected, the evacuations are invariably fluid and are discharged through or around the offending body. The stools are extremely offensive and contain considerable mucus, either alone or mixed with pus and blood. Impacted fecal masses and foreign bodies situated in the colon and sigmoid flexure cause much discomfort in the abdomen, excite frequent and prolonged peristalsis, and interfere greatly with the digestive process. When situated in the rectum they induce dull aching pressure pains, straining, a constant desire to evacuate the bowel, and reflected pains over the sacrococcygeal region, along the limbs, and in neighboring organs. Through irritation they may cause frequent micturition or excite the sphincter and levator ani to repeated spasmodic contraction, thereby causing much suffering and sometimes a hypertrophic condition of these muscles. Obstruction from these causes not infrequently leads to dilatation of the bowel, paralytic ileus, in addition to the usual manifestations consequent upon mechanical constipation from other factors.

Diverticula, which become distended and press upon the bowel, or which act as a nucleus about which the feces collect in quantities sufficient to obstruct the gut, lead to constipation and the same manifestations as does a fecal impaction or foreign body. When diverticula become inflamed, they induce local pain and other symptoms similar to appendicitis, and perforation gives rise to the clinical picture of circumscribed or general peritonitis. **Rectocele** causes very little trouble except when it serves as a trap in which the feces accumulate. In such cases it induces sensations of weight, fulness, bearing-down pains, and other manifestations that have been ascribed to fecal impaction in the rectum.

SPLANCHNOPTOSIS AND ENTEROPTOSIS

The condition designated by these terms may be *general* (Glénard's disease), when the liver, kidneys, spleen, stomach, and intestines descend below their normal level, or *localized*, when the displacement concerns but a single organ or section of an organ, as, for instance, when there is a sagging of some particular part of the large intestine. General splanchnoptosis reduces the patient to a deplorable state. He is emaciated, suffers from malnutrition, digestive disturbances, loss of appetite, anemia, cold extremities, weak pulse (which is much more rapid in the erect than in the recumbent posture), has sinking sensations, and dragging pains in different parts of the abdomen, pulsating aorta, frequent attacks of tympanites, colic, occipital and temporal headaches, neuralgias, bulging or pear-shaped abdomen (Fig. 76), the walls of which are thin and flabby (Fig. 60), loss of fat and weakened musculature throughout the entire body, pinched expression (Dietl's crises), and suffers from constipation, which at times alternates with diarrhea or is complicated by fecal impaction. When enteroptosis is due to separation of the recti muscles, the patient feels as if the abdominal contents were dropping out.

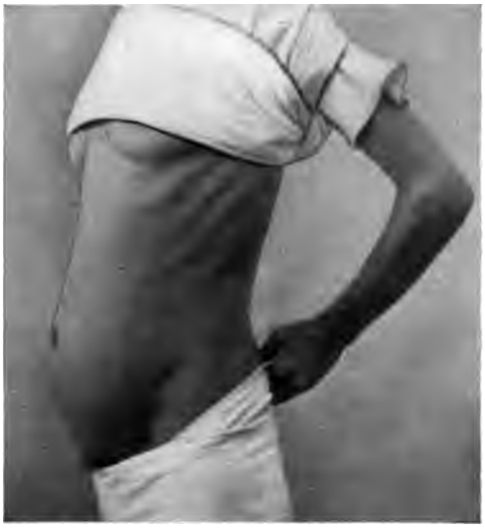
Fig. 76.—General ptosis (Glénard's disease) in unmarried woman aged twenty years, observed by the author, showing pendulous abdomen.

I know of no class of patients who suffer so much and receive so little credence for being sick as do persons suffering from enteroptosis.

In the main, the general manifestations induced by *ptosis* of the *bowel* are the same as those accompanying ptosis of other organs, as given above; hence, I will discuss the local disturbances only which are consequent upon the falling of all or some particular part of the large bowel.

When a considerable part of the colon descends into the lower abdomen and pelvis, it may drag the stomach along and press the small intestine down, causing, when the upright posture is assumed, prominent bulging, and sometimes an overhanging or pendulous belly, when the abdominal walls are thin and flabby.

Ptosis of all or any part of the colon is nearly always accompanied by constipation, and frequently by fecal impaction, because of the weakened condition of the intestinal and abdominal musculature, and further, because of the obstruction offered to the passage of the feces by the sagging of the bowel and the angulations and twists which accompany this condition.

Coprostasis adds to the patient's discomfort in many ways when the accumulated feces are permitted to assume considerable proportions and to remain until they become hard and nodular. The retained masses aggravate the constipation, causing distention from gas and pulling pains. A catarrh of the bowel is set up, accompanied by the copious discharge of mucus. Gastric and intestinal digestion are interfered with, owing to the frequent and prolonged peristalsis consequent upon damage to the gut by the fecal masses, which may also act as a source of irritation to neighboring organs.

The weight of the retained masses in fecal impaction causes a still greater displacement of the bowel, and sets up a sort of chronic inflammation which results in the formation of adhesions and agglutination of the gut in its unnatural position, lessening the mobility of the bowel, giving rise to soreness and tenderness on pressure, and in other ways adding to the patient's discomfort and to the gravity of his condition.

Ptosis of the sigmoid flexure represents by far the most common type of colonic ptosis, and this is readily accounted for by its great length, its long mesentery, and the fact that the feces are retained in it until shortly before defecation. I have treated a great many patients suffering from constipation resulting from ptosis of the sigmoid. In some the obstipation was dependent upon the massing of this part of the gut within the pelvis; while in others it was induced by invagination of the sigmoid into the rectum. The symptoms arising from sigmoidal ptosis are fairly clear. The patient is obstinately constipated, the excrement tends to collect and become impacted, causing left-sided distention and bulging, tenderness, sensations of weight, and dragging pains in the iliac and pelvic regions, uterine and vesical disturbances, a feeling as if the bowel was clogged, occasional discharge of jelly-like or stringy mucus, a sensation of distention and weight in Douglas' or the rectovesical pouch. The bowels rarely ever move of their own accord, artificial means being required daily to dislodge the feces; and for this purpose high enemata are more effective than the strongest cathartics.

Paralytic Ileus.—The clinical picture of chronic constipation and stenosis of the bowel in exceptional cases is complicated by the symptom-complex of total arrest of the motor powers of the intestinal muscular walls, induced by gradually developing muscular insufficiency. The bowel may be implicated in its entire length or short portions only may be affected. As a rule, the paralyzed segment is inflated and distended with gas, due to the loss of muscular tone in the bowel, and hence not amenable to measures aiming at its relief, such as puncture of the intestine to afford an escape to the accumulated gaseous contents. There is total obstipation, often associated with naüsea, meteorism, and fecal vomiting, and the patient's condition remains extremely grave until a way has been found to relieve him.

Invagination (**intussusception**) of the bowel, and especially of the sigmoid flexure, into the rectum is a more common cause of constipation than is generally believed. It may induce acute constipation or a chronic form of obstruction, the symptoms of both being at times confusing. The manifestations of the former do not differ from those of acute obstruction from other causes, which have been given elsewhere; but the symptoms of the chronic variety differ somewhat from those induced by invagination of the bowel in other localities, and for this reason I will give them separate consideration. Invagination of the sigmoid flexure is a frequent complication of ptosis of this part of the large bowel, for the reason that it is pushed down into the rectum by the fecal accumulations in the gut above. I believe, however, that an invagination may occur independently of this source. I am of the opinion that under normal as well as under pathologic conditions, invagination occurs during, and is a valuable aid to the act of, defecation. In other words, when the time for an evacuation has arrived and the abdominal muscles are brought into play, I believe there is downward and progressive rolling in or invagination of a part of the sigmoid into the rectum; which, acting as the piston of a syringe, follows up and drives the feces downward and outward, a mechanism similar to that noticeable in a horse when evacuating the bowel. This action of the bowel can easily be demonstrated by introducing marbles, wooden or cotton balls into the sigmoid flexure, inserting the sigmoidoscope, and requesting the patient to strain down as the instrument is slowly withdrawn. Immediately the balls will begin to descend, closely followed by invaginated or rolled-in bowel, until they are forced out of the rectum. If this occurs under normal conditions it is easy to understand how chronic invagination may occur when there is ptosis of the descending colon and sigmoid flexure, which permits an abnormally large amount of bowel to prolapse into the rectum.

In some instances when the sphincter muscle is weakened, the invaginated gut may be seen protruding outside the anus during and following an evacuation. Naturally, the degree of constipation and accompanying manifestations consequent upon enteroptosis and invagination depend largely upon the amount and condition of the prolapsed gut. In some patients invagination appears to occur only at rare intervals, and the bowel recedes after defecation; while in others it is of frequent occurrence and a part of the sigmoid remains invaginated into the rectum a greater part of the time. This explains why it is that one patient having chronic invagination may suffer from occasional or intermittent attacks of obstipation, while another is constipated nearly or all the time.

When the bowel is irritated, inflamed, and thickened, or the lumen of the gut is greatly lessened, constipation may alternate with, or give way to, diarrhea. The patient has a constant desire to stool, goes frequently to the closet, but passes nothing except mucus, and has a persistent feeling as if there was an obstacle of some kind which prevented the passage of the feces. There are sensations of weight and fulness and bearing-down pains in the region of the sigmoid, caused by the accumulated feces. Very strong cathartics or copious soap-suds or oil enemata are usually required to dislodge the retained excrement, which comes away in the form of small round scybala, or large nodular masses having a disagreeable odor, and covered by moist or inspissated mucus, or by streaks of pus or blood in ulcerative cases.

When the impacted mass is large and pushes the gut downward it induces much discomfort and pain in the rectum, in neighboring organs, and the sacrococcygeal region. In such cases the tumor-like mass can be plainly outlined by a digital, rectal, or vaginal examination. Sometimes patients suffering from chronic constipation induced by invagination may go for days without an evacuation and yet be comparatively comfortable, while at other times the obstruction may be sufficient to induce flatulency, colicky pains, nausea, vomiting, and other symptoms common to occlusion of the bowel, and in rare instances, when the invaginated bowel becomes adherent in its unnatural position, it is only a question of days or weeks before death will ensue unless the gut be released.

Patients suffering from this type of mechanical constipation often go the rounds from one doctor to another, becoming discouraged and despondent because their condition does not improve, for the reason that the case has been carelessly and improperly diagnosed and a rational method of treatment has not been instituted.

Dilatation of the colon is accompanied by many of the same symptoms as splanchnoptosis. In these cases it is almost impossible, owing to the weakened condition of the intestinal musculature, to prevent the gradual collection of feces and gas within the dilated section of the bowel. In idiopathic dilatation of the colon (giant growth), megacolon, or Hirschsprung's disease, enormous amounts of excrement have been known to collect and remain for many weeks, causing but slight disturbances, such as difficult breathing, indigestion, and nervousness, but in other instances fecal accumulations have been the cause of heart failure, nausea and vomiting, indigestion, colitis, ulceration with rupture, and peritonitis. Under these conditions water introduced into the colon often is retained for an indefinite period, for the reason that the bowel has not sufficient power to expel it. In this class of cases the enormous size of the colon causes a greater degree of abdominal distention than dilatation from obstructive causes, otherwise the symptoms are practically the same and require no further discussion.

Hypertrophy of O'Beirne's sphincter does not cause any characteristic disturbances, further than a slight soreness and a feeling as if the feces were always arrested when they reach that section of the gut surrounded by this muscle. On account of the obstruction offered to the passage of the excrement by the thickened and irritable condition of O'Beirne's sphincter, the fecal matter accumulates in considerable quantity in the sigmoid flexure, giving rise to sensations of weight, fulness, and dragging pains in the left iliac and pelvic regions. Persons suffering from this type of chronic constipation may go for days or weeks without having any desire to stool, and the sigmoid may become enormously distended and displaced and produce (reflexly) unpleasant sensations and pain in parts far removed from the seat of the trouble. It is impossible to keep the bowel free except by means of frequent and copious enemata or almost continuous purgation.

Hypertrophy of the rectal valves may be either a cause or a result of constipation. The troubles arising from occlusion of the bowel by a thickened valve are not so pronounced or dangerous as are those accompanying the types of mechanical obstruction previously described. In fact, with one or two exceptions, the symptoms do not differ from those of habitual (non-obstructive) constipation. When the valves are very rigid and project for a considerable distance into the lumen of the bowel they interfere with the fecal current, and the excrement may collect and rest upon them for hours or days without inducing a desire to stool, but causing considerable discomfort in the vesical and sacrococcygeal regions. It is in these cases that a few ounces of water injected into the rectum serve to procure an evacuation by dislodging the masses from their resting-place. Persons suffering from this type of costiveness often volunteer the information that it is frequently necessary for them to insert the finger high up and hook it over hardened fecal lumps in order to get them out of the rectum.

Examination through the proctoscope at once reveals the condition of the valves, and the location and amount of the feces retained by them.

Hypertrophy of the levator ani and **sphincter muscles** invariably aggravates the constipated state and causes much annoyance. Instead of assisting in the act of defecation, as they do under normal conditions, they make the discharge of the feces difficult, if not impossible, without the aid of artificial means. The patient may have a most urgent desire to have an evacuation, but when he goes to the closet and endeavors to empty the bowel, as soon as the feces reach the anal canal, one or the other of these muscles, or both, suddenly contract, closing the lower rectum and preventing a passage. In some instances they alternately contract and relax, permitting the excreta to be evacuated in flattened or tubular fragmentary pieces. Spasms of these muscles when of short duration and at considerable intervals do not cause much trouble, except in so far as they interfere with defecation. But when they are frequent and prolonged, they invariably induce great suffering, and dull agonizing pains are felt in the sacrococcygeal and vesical regions. There is invariably a frequent desire to urinate, but it is difficult to evacuate the bladder because of the reflex irritation caused to the urinary sphincter.

Hypertrophy of the sphincter muscle is of common occurrence, and is not infrequently complicated by fissure, ulceration, hemorrhoids, or other local pathologic conditions, which add greatly to the patient's discomfort during and after defecation. Because of the pain following the evacuations, this class of sufferers defer the bowel movements as long as possible. In this way they aggravate their condition by permitting the feces to accumulate, become firm and nodular, and when the impacted mass is expelled the injured rectum is further bruised and torn, causing the most intense pain at the anus during stool, and in the region of the bladder and sacrum, following the act of defecation.

LOCAL AND REFLEX MANIFESTATIONS ARISING FROM FECAL RETENTION IN THE COLON AND SIGMOID FLEXURE

In persons who suffer from habitual constipation the feces are prone to accumulate and be retained in certain parts of the large bowel more frequently than in others. In my series of cases the impaction has been encountered in the order of its frequency in the rectum, sigmoid flexure, cecum, and transverse colon. Sometimes there are multiple accumulations situated in one or more sections of the gut just named, and in rare instances the entire colon may be partially or completely filled with mushy, semisolid, compact, or nodulated fecal accumulations.

The excrement when soft or semisolid may remain in any part of the large bowel from twenty-four to thirty-six hours and cause but little discomfort, but when permitted to remain longer, increase in amount, and become firm it may cause both local and reflex disturbances.

In the earlier stages such an accumulation produces sensations of *weight*, *fulness*, and *irritation* to the *mucosa* in the section of bowel where it is located. When permitted to remain for a longer time, it causes *hyperemia* and *inflammation* of the mucosa, marked by redness, tenderness, and an increased amount of mucus, which may be discharged at short or long intervals in the form of strings, balls, jelly-like masses, or tubular casts of the intestines. The *catarrhal condition* thus excited by traumatism of the gut by the fecal mass not infrequently assists the offending body to become dislodged and expelled, for the reason that it excites *peristalsis* and causes the intestinal tract to become *lubricated* by the mucus. In cases which are not so fortunate, the mass or masses remain, to become larger and harder, until they become a persistent source of irritation, not only to the bowel but also to adjoining structures as well.

The inflammatory process, beginning as a simple catarrh of the mucous membrane, gradually extends to the submucosa and muscular layers of the bowel, causing them to become *thickened*, *rigid*, and *massed* together, thereby diminishing their *motility* and favoring *atony* or glandular and muscular inactivity, all of which conditions serve to make more difficult the passage of the feces in their downward course.

The inflammation consequent upon fecal impaction may extend to the peritoneum, inducing a localized chronic form of *peritonitis*, which invariably results in the formation of *adhesions* and *tumefactions*, which bind different parts of the bowel to each other, to the abdominal parietes or to neighboring organs, and as a result *peristalsis* is often interrupted and the motility of the colon greatly lessened.

As a sequel to prolonged injury of and pressure upon the mucosa by the fecal accumulation, the local blood-vessels are damaged, resulting in *ulceration*, the terminal nerve-filaments are kept in a constant state of irritation, and the mucous glands are stimulated to secrete an *abnormal* amount of mucus, while the condition of the bowel favors a rapid multiplication of the contained bacteria. In consequence of this unnatural state of affairs, not only the large bowel, but the rest of the digestive tract as well, are kept in a constant state of uneasiness. There is frequent and violent peristalsis, a result of the conditions just alluded to, and the bowel constantly reattempts to rid itself of the offending feces. In consequence, a so-called *spurious diarrhea* is induced, characterized by offensive fluid discharges which escape by or through the blocking mass.

When the accumulations recur with more or less frequency and bring about the conditions just described, this class of patients not only complain of *soreness* and *burning* in the bowel, but suffer from *colicky pains*, slight or agonizing in character, due either to the retained gas or to enterospasm, and are also afflicted with *pulling* or *dragging-down* pains.

Large accumulations situated in the cecum, transverse colon, and sigmoid flexure invariably drag one or more sections of the colon downward, producing *enteroptosis*, sharp *angulations*, and, not infrequently, *volvulus*. *Adhesions* form, which fasten the gut in its unnatural position; all these conditions adding materially to the gravity of the situation. Owing to this additional *obstruction*, the bowel becomes frequently distended, both from the accumulation of the feces and the retained gases, and in consequence *dilatation* occurs and a *paralytic* condition of the intestine promptly follows.

Fecal tumors, when of considerable size, not only injure the bowel, but frequently press upon the *abdominal* and *pelvic organs*, producing much discomfort and pain and otherwise impairing their functions. Again, they not only compress the nerves, but they drag upon the mesenteries and cause pain and reflex digestive disturbances, which are not infrequently mistaken for disease in other organs, and a fecal impaction is not suspected because of the accompanying diarrhea already referred to.

Constipation and coprostasis of long standing usually produce an *atonic* state of the bowel and a corresponding weakness of the intestinal musculature or contraction of the gut. When this occurs, together with considerable fecal impaction, the impacted masses sometimes cause a separation or stretching of the muscular fibers in the sacculated colon at one or more points. There is a bulging of the bowel outward, and in this way are formed intestinal *pouches* or diverticula. These false cavities serve as reservoirs for the collection of feces, which remain and become encysted, causing more or less irritation, or they provide a nidus upon which the excrement catches and accumulates in quantities sufficient to produce partial or complete obstruction.

In those cases of constipation in which the feces are prone to collect in large quantities and remain in the *cecum*, they often traumatize the parts, giving rise to the local manifestations already referred to, and, in addition, may induce *appendicitis* and *typhlitis*. When situated at the hepatic flexure the mass may press upon the *ductus communis* sufficiently to induce *jaundice* or may retard the portal circulation and in other ways interfere with the functions of the liver.

Coprostasis of the **transverse colon** interferes with gastric digestion and often causes atony, displacement, and even distention of the stomach through direct pressure and reflex action, which in turn leads to vomiting, palpitation, and other distressing manifestations. Because of the weight of the feces, a *stasis* of this part of the bowel is produced; its central portion being sometimes dragged downward until it reaches the umbilicus or even the pelvic floor, where, under favorable conditions, it may be outlined.

Once through the splenic flexure, the feces do not tend to collect until they reach the sigmoid colon. The anatomic make up of the sigmoid flexure, its location, curves, sharp angulations, and the small-sized opening between it and the rectum (O'Beirne's sphincter), all contribute to make it the natural storehouse for the retention of the excrement until the time for evacuation has arrived. Consequently, any deviation from the normal in this part of the gut greatly favors coprostasis and its many annoying symptoms.

The special manifestations of large fecal accumulations in the flexure are sensations of fulness, uneasiness, and pain in the regions of the left lower abdomen, pelvis, uterus, tubes, ovaries, and bladder, symptoms which not infrequently lead the inexperienced to suspect disease in the organs named. As the sigmoid flexure becomes loaded it rises upward, rolls over, and is most frequently found on the right brim of the pelvis. In exceptional cases, however, owing to its great length and mobility, it may be located in almost any part of the abdomen. Not infrequently, where there is a *ptosis* of this part of the bowel, it will be found packed into the pelvis, displacing the uterus and bladder, and pressing upon the sacral nerves, causing much suffering and forming a very acute angulation at the rectosigmoidal junction, which makes it wellnigh impossible for the feces to escape through O'Beirne's sphincter into the rectum. I have often encountered cases where the fallen and impacted sigmoid flexure, through straining, became *invaginated* into the rectum, forming a tumor-like mass discernible by digital examination. The tumor is apt to be mistaken for sigmoidal cancer or a neoplasm in neighboring organs because of the sensation of induration given to the examining finger by the invaginated fecal mass through its mucous covering, and, further, because of the straining, pressure pains, discharges of mucus, and frequent stools induced by it.

DISTURBANCES OF THE RECTUM AND ANUS CONSEQUENT UPON CONSTIPATION AND FECAL IMPACTION

It is generally conceded that constipation is one of the most important etiologic factors in rectal disease. When the feces are frequently permitted to collect and remain for a considerable time in the rectum they produce sensations of local weight and fulness, tenesmus, furred tongue, toxemia, etc., and induce a hyperemia of the mucous membrane, with proctitis, dilatation, atony, and immobility of the gut, and many other uncomfortable and distressing manifestations around the rectum and vicinity.

The damage inflicted on the lower bowel by constipation and coprostasis depends principally upon the frequency with which the feces accumulate in the rectum, their size and consistence, and the length of time they are retained. Naturally, when they accumulate only at rare intervals, are soft and semisolid in consistence, small in quantity and are retained but a short time, they induce less local disturbance than when impaction is of frequent occurrence, and the mass is of considerable proportions, compact or nodulated, and the retention has continued for a long time.

Constipation in its incipiency causes but slight if any disturbance around the rectum and anus, but when permitted to go unrelieved year after year it will sooner or later be the direct or indirect cause of one or more of the manifestations hereafter to be described.

In the normal state the entrance of the feces into the lower rectum in some unknown way produces the sensation known as the desire to evacuate the bowel. When this *desire to stool* is heeded the levator ani lifts the rectum upward and over the fecal mass as the latter is forced downward. This muscle then constricts the sides of the bowel to expel the feces simultaneously with the relaxation of the external sphincter muscle, which permits the mass to be expelled.

When, through ignorance, false modesty, indifference, or what not, this warning of the presence of feces in the rectum is ignored and defecation is repeatedly postponed, dire consequences must necessarily ensue. One of the first noticeable changes is a *diminished sensibility* of the rectal mucosa, owing to an obtunded condition of the mucous membrane and a diminished excitability of the nerves, caused by damage of their sensitive endings by the retained excrement. If costiveness is not corrected in time, this change now permits large quantities of feces to accumulate without producing the slightest desire to evacuate the bowel. The nerves transmit no impression of the presence of a fecal mass in the rectum, either to the brain or the spinal centers which control the act of defecation, and consequently the patient does not realize that there are retained feces in his rectum.

Continued traumatism of the bowel induced by the hardened feces invariably results in *proctitis*, which is accompanied by sensations of *weight* and *fulness, tenesmus, burning pain in the rectum*, and frequent *mucoid discharges.* When the bruising of the bowel is permitted to continue, the *inflammatory process* extends to all the coats of the bowel, causing *fixation* and *rigidity* of the rectal wall, with *muscular* and *glandular inactivity.* Fecal masses which tend to collect and remain stationary at some particular point in the rectum may press sufficiently upon the adjoining blood-vessels to obstruct their circulation and induce slight or extensive *ulceration* and necrosis, and when there is fecal impaction of weeks' or months' duration, *sloughing* may occur to an extent which results in *stricture* when the ulceration has healed. Such a case has come under my personal observation.

When the mucosa is denuded in this way, any small object swallowed, such as a fish-bone or seed or a small fecolith, may become lodged beneath the edge of an ulcer, causing an infection which may terminate in *abscess* and *fistula*—conditions rarely consequent upon constipation.

Large, firm, or nodular fecal masses situated in the rectum cause much local discomfort because of the *bearing-down* feeling and *straining* induced by them, and also *coxalgia*, backache, leg-ache, and reflex pains in parts remote from the bowel, owing to injury of the adjacent nerves. In addition to the above manifestations, fecal impaction may, through pressure and irritation, cause serious disturbances in *neighboring organs*, and in consequence the urethra, prostate, bladder, seminal vesicles, and female genital organs are suspected of disease and given special treatment, while all the time the trouble is purely reflex. In consequence of the frequent and prolonged stretching of the rectal wall by retained feces, extreme and permanent *dilatation* of the entire movable rectum occurs, a not uncommon manifestation of constipation and coprostasis. In exceptional cases, however, dilatation may be restricted either to a forward bulging, anterior *rectocele*, or a backward pouching of the bowel and displacement of the *coccyx*, *posterior rectocele*. Naturally, in this class of cases the *contractile* power of the rectum is greatly diminished because of the weakened condition of its muscular fibers and the injury to the terminal nerve-filaments. When the bowel is in this deplorable condition, and the feces are permitted to collect in enormous amounts, *rupture of the intestine* may ensue.

Prolapsus of the rectum is occasionally a manifestation of constipation, owing to a dragging down of the bowel by the fecal mass or the prolonged straining induced by it.

Anal fissure is a frequent symptom of constipation, both in childhood and adult life. In constipated persons the retained feces accumulate, the watery portion is absorbed, and large, compact, or small nodular fecal masses are formed. The anus is small and is lined by mucous membrane, which is extremely fragile. In order to pass this narrow orifice the large hard fecal lumps must be propelled with all the muscular strength of the rectum and abdominal muscles combined, and the delicate mucous membrane is torn. This rent is reopened and irritated every time the bowels move, and finally becomes a chronic irritable ulcer or *fissure in ano.*

Hemorrhoids constitute the most common ailment induced by constipation and fecal impaction occurring in the anorectal region. Owing to the upright position assumed by man and the absence of valves in the rectal veins to support the blood column, it is easy for a fecal accumulation to prevent the return flow of venous blood to the portal circulation. Because of the congestion which follows and the frequent and prolonged straining incident to the expulsion of the feces, varicosities of the hemorrhoidal plexus soon develop, constituting what is known as piles.

Reflex disturbances are quite common in constipated subjects, of these perhaps the most important and frequent are those noticeable in connection with the levator ani and external sphincter muscles.

Hypertrophy of the anal sphincter and of the **levatores ani** occur often in this class of cases, owing to repeated traumatism and irritation induced by chronically retained fecal accumulations. Normally, these muscles aid in the act of defecation, but when they are repeatedly excited to frequent contractions by offending fecal accumulations they become hypertrophied and sensitive through overwork, and as a result act as an obstacle to the expulsion of the feces. In some instances they are rigid, immensely thickened, and *contract spasmodically*, closing the anal canal and anus as soon as the feces reach the lower rectum.

In the chapter on Anatomy the rectal valves were fully described, and it was pointed out that they project into the lumen of the rectum and give to the feces a rotatory or step-by-step motion in their downward course (Fig. 5).

The **rectal valves** may, in consequence of repeated damage done them, and of the irritation and inflammation caused by constipation and fecal impaction, become *hypertrophied*, and further add to the gravity of the condition by interfering with the fecal current.

Before concluding the discussion of the local manifestations encountered in the anorectal region incident to constipation, I desire to mention one other distressing though not common local manifestation, that of **pruritus ani.** Itching at the anus is more troublesome at night than during the day and results from irritation to the skin by mucoid and other discharges coming from the rectum or from interference with the nerves and circulation caused by the pressure of the fecal mass. When induced by the latter, the itching immediately ceases upon the evacuation of the fecal accumulation.

CHAPTER XII

DIAGNOSIS

In the majority of instances it is comparatively easy to make a correct *diagnosis* in the case of constipated individuals, because the patient at once says that his bowels act irregularly; meaning that the evacuations are too hard, too long delayed, or too small in amount. It is, however, a most difficult task in many cases to determine the nature of this constipation and to detect the etiologic factors which are responsible for the infrequent and insufficient stools.

The success of the treatment will depend entirely upon whether all the elements tending to produce and aggravate the constipated state are discovered and corrected. Usually there will be found one or more etiologic factors which are strong enough to interfere with the fecal current and delay the evacuations; and also conditions consequent upon the original causes which unless corrected are in themselves sufficient to keep up the constipation even after the original causes of the trouble have been removed.

In order to arrive at a satisfactory conclusion as to the nature of the trouble, it is necessary to examine constipated individuals first in one position and then in another. By changing the position of the patient from time to time during the progress of the examination much valuable information is elicited which, under less favorable circumstances, might be overlooked.

After the patient has been stripped down to the hips, it has been my custom to go over him carefully while standing in the *erect posture;* he is then placed upon a firm table, flat upon his back, with the legs fully extended, and, finally, the examination is completed with the patient in the semiprone position. The latter and the lithotomy postures are employed while the anus and rectum are being examined with the finger or speculum, and the knee-chest position when the proctoscope and sigmoidoscope are used.

It is exceedingly important to find out if the patient is suffering from *habitual constipation* due to atony, enterospasm, improper diet, irregular habits, etc., or if the constipated state is the fault of some mechanical obstruction which prevents the free passage of the excrement through the intestine.

In order to make a *rational* diagnosis in constipated individuals it is necessary to have a routine method of examination. This should consist in obtaining a complete history of the case; in making a careful *inspection* of the patient; in palpating the abdominal and anorectal regions; in percussing the liver, stomach, intestine, and pelvis; in practising *succussion* along the course of the colon and of the stomach; in making a *macroscopic* and *microscopic* examination of the feces; in examining the *blood, urine*, and *stomach contents;* in *distending* the bowel with gas or water; in inspecting the rectum and sigmoid flexure through the *proctoscope* and *sigmoidoscope;* in making a thorough *digital* examination of the rectum and vagina; and, finally, in cases where the diagnosis still remains in doubt, *x-rays* should be employed, the patient *examined under ether*, or an *exploratory* incision should be made to determine the nature of the trouble. Patients suspected of having enteroptosis or other intestinal disturbances should he submitted to a careful examination of the *spine.* In the presence of these affections, tender spots in the dorsal, sacral, or lumbar region may often be elicited by electricity, more particularly the faradic current, giving valuable indications of disease located in the gastro-intestinal tract.

History.—A thorough history should be taken and recorded in each case, for in this way much valuable information can be obtained from the patient, which will give some idea as to the nature of his trouble. By means of the history one can learn how long the patient has been constipated, the frequency of the evacuations, the color and consistence of the stools, and whether or not they cause pain or bleeding when discharged. One can discover if the patient has had lead-poisoning, gonorrhea, syphilis, dysentery, diarrhea, typhoid fever, peritonitis, appendicitis, pelvic inflammation, digestive disturbances, diseases of the liver, gall-stones, congenital deformities, rheumatism, or other ailment which might cause stricture of the intestine, adhesions, and tumefactions, or interfere with the passage of the stools by making the feces too hard, causing obstruction, weakening the abdominal and intestinal musculature, or have an inhibitory influence upon the act of defecation.

Again, by questioning the patient one can ascertain his occupation, whether he leads an indoor life or takes plenty of exercise, if he is abstemious or drinks, the nature of his diet, if he is regular in his habits, if he is of a nervous temperament, and, finally, find out if the evacuations are really too far apart, insufficient in quantity, or too firm in consistence, for many persons believe they suffer from constipation when such is not the case.

General inspection of the patient is a most valuable aid in the diagnosis of constipation when it is carefully carried out. By inspecting the teeth one can form an opinion as to whether or not the food is properly masticated; and the condition of the tongue is often an index of the presence of hepatic, gastric, or intestinal disease.

Inspection of the body enables one to determine immediately if there is any visible tumor or deformity, and if the patient is overfat, emaciated, anemic, cachectic, and whether the skin is normal or diseased. Again, one can observe whether the abdomen is distended or flat, and whether its walls are thin and flabby, or its musculature well developed, and able to afford the necessary support to the abdominal viscera.

In constipated individuals a careful inspection of the abdomen frequently reveals the fact that one portion bulges more prominently than another, that there are depressions, or that the abdominal wall is pendulous or overhanging. Irregularities of the above types in the contour of the abdomen may result from an enlarged or displaced organ or part of the bowel, tumors, fecal impaction, or distention of some particular part of the intestine with gas, retained by the presence of a new growth or other mechanical obstruction, such as enteroptosis, angulation, volvulus, or invagination.

It should never be omitted to look out for little hernias in the median abdominal line, especially near the umbilicus, because they often account for obscure troubles.

In cases of fecal impaction of long standing the abdomen along the course of the colon sometimes presents a beaded or sausage-like appearance, owing to the bulgings caused by impacted masses. In rare instances, when the abdominal wall is sufficiently thin, violent peristaltic movements provoked by obstruction of the bowel are visible to the naked eye.

External and internal inspection of the anorectal region frequently enables one to detect invagination of the sigmoid, strictures, malignant growths, fibrous bands, hypertrophied rectal valves, chronic proctitis, abscesses, hemorrhoids, ulceration, and fissure, which cause or assist the establishment of the constipated habit.

Palpation is one of the most valuable of all the physical guides in determining the etiology of constipation, and one should never neglect the aid of this method in diagnosis.

By superficial palpation one can readily ascertain the condition of the abdominal wall, and determine if it is too thin or too fat, rigid or relaxed, whether it gives sufficient support to the abdominal viscera, or favors enteroptosis by its sagging. Again, one can note the condition of the abdominal muscles and determine whether or not they properly assist during the act of defecation. By means of deep single-handed or bimanual palpation one can locate soreness and painful spots in the abdominopelvic regions, determine the size, location, and mobility of the intestine and other organs, and find out the situation of neoplasms, adhesions, tumefactions, and retained fecal accumulations. In cases of constipation complicated by fecal impaction of long standing, palpation enables one to determine not only the amount, size, consistence, number, and location of the masses, but enables one to differentiate between fecal tumors and malignant neoplasms.

Cancer and other growths are hard, fixed in their location, and are not indentable, while a fecal tumor is of doughy consistence, usually movable, and when an indentation is made with the fingers it remains. Again, the mucous membrane can be made to slide over an impacted fecal mass, while the mucosa situated over a malignant neoplasm is immovable. The abdomen should be palpated with the patient in different positions and while the bowel is empty, also after the gut has been inflated with gas or water, in order to note any changes which may manifest themselves under these different conditions.

A **macroscopic examination** of the stools should be made in every person suffering from constipation. A glance at the evacuations enables one to determine whether they are abnormal in amount, color, consistence, or form. Usually the feces of constipated individuals have a deep-brown color, but this is subject to change by certain foods, wines, and medicines. For example, during an exclusive milk-diet the feces are colored yellow; when considerable wine has been consumed, they are dark brown; after taking calomel, they are green; after bismuth, iron, and sulphur, black; after rhubarb, senna, and santonin, yellow; and during a bilious attack, they are often clay colored.

When the excrement is discharged in the form of long ribbon or tube-like pieces it indicates enterospasm or a stricture of the bowel, probably in or below the sigmoid flexure, and when evacuated in the form of short flat or narrow round fragments one is justified in suspecting some irritation in the lower rectum which excites the levatores ani and sphincter muscles to frequent contraction.

When the feces are expelled in the form of hardened bullet-like scybala, resembling sheep-dung, or large, hard, nodular, faceted masses, it shows that they have remained in some part of the bowel for several days, and that their retention is probably due to some mechanical cause which interferes with their downward passage, such as hypertrophy of O'Beirne's sphincter, invagination of the sigmoid, angulation, sacculation, volvulus, tumors, adhesions, or extra-intestinal pressure. If when voided these nodules have a distinctly foul odor and are covered with glairy or inspissated mucus, it shows that they have been impacted for days, weeks, or perhaps months. The periodic discharge of such foul nodular collections, alternating with attacks of diarrhea, invariably indicates the existence of chronic fecal impaction.

In the absence of any digestive disturbances or obstruction in the rectum, when the excrement is evacuated from day to day in a thin fluid, mushy state, the patient in all probability suffers from a cancer, stricture, or other pathologic condition which constricts or obstructs the lumen of the small bowel, colon, or sigmoid flexure.

It is not a safe practice to exclude stricture high up in the bowel simply because the stools may appear normal in shape or consistence; for I have frequently encountered patients suffering from stricture of the large intestine, where the liquid feces escaped through the constriction into the rectum, and remained there until the watery portion had been absorbed before being evacuated, when they appeared normal both in consistence and shape.

When the evacuations are composed of or contain a considerable amount of stringy or glairy mucus, one should suspect that the patient is suffering from acute or chronic hypertrophic colitis; but when they contain large membranes like pieces or tubular casts of the bowel the diagnosis of so-called nervous or membranous colitis is justifiable. The presence of fragments of tissue, dark pigment, and enormous quantities of jelly-like mucus invariably suggests the existence of a melanotic, colloid, or other form of malignant disease. Blood in the stools of constipated subjects points to ulceration, stricture, malignant disease, uncinariasis, papillomata, prolapsus, hemorrhoids, or fissure. When the blood is clotted and resembles coffee-grounds it indicates disease of the bowel at some point above the rectum; but when fluid blood of a bright red color is voided one should examine carefully for some diseased condition of the lower rectum or anus, such as ulceration, piles, or fissure.

Macroscopic examination of the feces not infrequently reveals the presence in the stools of fecoliths, enteroliths, gall-stones, and foreign bodies, the discovery of which gives the clue to the cause of the constipation.

Microscopic examination of the feces is of comparatively little value in determining the cause of constipation, especially when it is of the habitual type. By this means, however, one can readily determine if the food is too concentrated, and if there is an overabundance of vegetable fibers, starchy remnants, meat-fibers, fat-globules; and in this way form some idea as to whether or not constipation is due to a poor digestion or to the predominance or lack of some particular form of diet. Inspection of a sample of the feces will determine the presence in them of mucus, blood, or pus, alone or mixed; and will give the examiner confirmatory evidence of the existence of cancer, stricture, catarrh, or other inflammatory or ulcerative conditions which might induce or aggravate a constipated state.

Examination of the stomach contents, blood, and **urine** should be made in every case of constipation in order to determine, as far as possible, the cause and consequences of the constipated state. An analysis of the gastric contents will help to determine the influence of stomach digestion in bringing about and prolonging the costiveness. It is known how frequently hyperacidity and hypersecretion are associated with constipation. An examination of the blood enables one to determine if the patient is anemic, and to what extent; and as to whether or not constipation is complicated by some other condition, such as cancer, suppurative inflammation, intestinal auto-intoxication, lead-poisoning; and very often indicates the presence of intestinal parasites.

Chemical and microscopic examination of the urine is very essential in this class of cases, in order to find out whether the patient is suffering from Bright's disease, diabetes, or if there is an overabundance of indican. Constipation is quite common in cases of diabetes, for the reason that the water consumed is not permitted to soften up the feces as it should because of the rapidity with which it is excreted by the kidneys. The amount of indican in the urine is markedly increased in copremia; and the solid constituents of the urine in cases of long-standing coprostasis may be increased to such an extent that the urine is almost white.

Auscultation is of little diagnostic value in the study of constipation, except in so far as it permits one to locate gurgling sounds, and the trickling of water and hissing noise of gases, while being artificially introduced, in order to distend the bowel for purposes of examination. By auscultation one can determine whether or not there are lesions of the heart and lungs, which might debilitate the patient or otherwise aggravate his condition.

Percussion is very often a great help in determining the presence and location of tumors, fecal impaction, and other pathologic conditions, which would interfere with the fecal current and cause constipation. By percussing the abdomen with the fingers one can determine with more or less certainty whether or not the intestine, especially the colon, and other abdominal and pelvic organs are enlarged or displaced, and whether the bowel is empty or whether it is partially or completely filled with gas or feces. Percussion over an enlarged liver, tumor, or fecal mass gives a flat note, while over the intestine normally the sound has a higher pitch. In cases of enteroptosis the degree of displacement and dilatation can easily be determined by carefully percussing along the course of the colon, first in the empty state, and then after it has been distended with gas or water. Again, percussion is useful in locating tumors and strictures, in conjunction with inflation of the bowel with gas. The part of the gut below the constriction which has been distended gives a very high note on percussion, while the empty part of the bowel above it gives a much lower tone. It is well to bear in mind that one may obtain a high note over a tumor at one time; while at another, percussion produces a flat sound. This is accounted for by the presence at times over the tumor of a part of the intestine filled with gas; while at another time there is nothing interposed between the neoplasm and the abdominal wall.

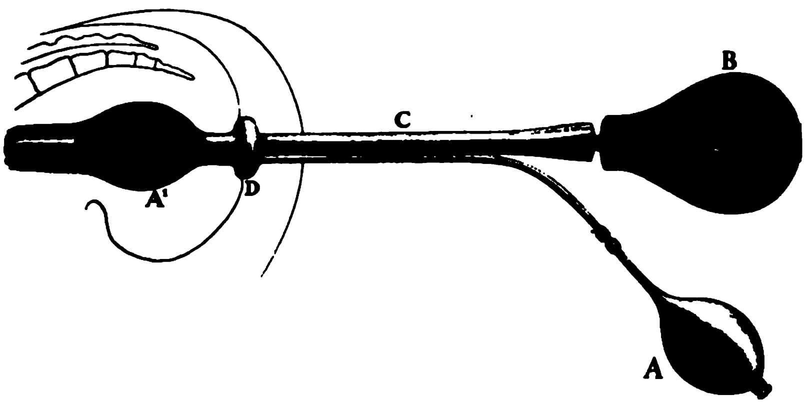

Fig. 77.—Inflating and irrigating rectal tube.

Inflation and **distention** of the bowel with compressed air, gases of various kinds, and water is of inestimable value in helping one to arrive at a correct diagnosis in obscure cases of constipation. By distending the bowel in this way (with a Strauss inflating tube) one can demonstrate its size, mobility, and location, and discover whether it is of abnormal size, bound down by adhesions, or displaced. The simplest and quickest way to inflate the large intestine is to connect a colon-tube with a compressed-air apparatus and then introduce the tube into the sigmoid flexure (Fig. 77). The air is then permitted to slowly fill the bowel, the thumb being kept constantly upon the valve connected with the tank, in order to prevent the rapid escape of a large amount of air into the gut, which would cause much pain and might rupture the intestine. I have used air, oxygen, and carbonic acid gas for inflation in the manner above indicated. I have also employed a double-bulbed inflating tube, inverted siphons of Vichy and Seltzer, and have experimented with bicarbonate of soda and tartaric acid, which have been introduced into the bowel for purposes of inflation. None of these latter methods have any advantage over that first described, which is so simple, safe, and effective. All means employed to distend the bowel cause little or great discomfort, depending upon the degree of distention, but the inconvenience is much less when the gas or water is permitted a very slow entrance. As a rule, inflation is serviceable in the diagnosis of conditions affecting the colon, owing to the obstruction offered to a further passage upward by the ileocecal valve. I have, however, occasionally been able by gradual distention to overcome the resistance of the valve, and have succeeded in introducing both gas and water into the small intestines. The bowel can be inflated while the patient is in the recumbent, Sims', or knee-chest posture; the latter being preferable because it permits the intestine and other organs to move forward and allows the bowel to become easily and quickly distended (Figs. 84, 88). When the colon-tube cannot be successfully passed, the sigmoidoscope should be introduced, and the tube pushed up through it into the colon (Fig. 223). The sigmoidoscope is now withdrawn and the colon-tube is connected with the inflating apparatus (Fig. 77).

After the bowel has been inflated and the examination completed, a proctoscope should be introduced, in order to permit the gas or water to escape and relieve the patient of the pain caused by distention.

Inflation of the bowel with water is preferable because of its weight in determining whether there is enteroptosis or downward displacement of all or a part of the colon. By siphoning off the water after inflation one can often determine the presence of a cancer, ulcer, or colitis by noting the presence of fragments of tissue, blood, mucus, or pus in the water as it runs out, or by a process of filtration. Distention of the gut not only enables the examiner to determine its size, location, and mobility, but helps him to locate tender points and strictures, and to differentiate between tumors of the bowel wall and neighboring organs by lifting the bowel upward, so that the neoplasm can be recognized by percussion or palpation.

Succussion is occasionally of service in helping to clear up the diagnosis in persons suffering from constipation. It aids one to determine if the bowel or stomach is dilated or displaced, but is of no use from a diagnostic standpoint in locating lesions of the small bowel. Boas[1] maintains that if succussion sounds can be heard when the intestine is but partially distended with water, it points to atony of the bowel.

x-Ray.—The importance of the *x*-ray in diagnosis of diseases of the gastro-intestinal tract is gradually becoming more and more appreciated. This diagnostic procedure is of great value in obscure cases of constipation supposedly due to adhesions, dilatations, neoplasms, or ptosis of the bowel. By tracing bismuth injected into the intestine, angulations and displacements of the gut can usually be accurately diagnosed. In the same way tumors which project into the lumen of the bowel can be outlined with more or less certainty. The usefulness of the *x*-ray in locating foreign bodies within the gastro-intestinal tract is generally conceded.

When a proper history has been taken and the patient has been carefully examined after the routine method above advised, and the diagnosis still remains in doubt, the patient should be examined under ether, and while he is still unconscious an exploratory incision should be made, if necessary, to determine the cause of the trouble.

DIFFERENTIAL DIAGNOSIS BETWEEN OBSTRUCTIVE AND NON-OBSTRUCTIVE CONSTIPATION

It is absolutely essential for every one who hopes to attain success in the treatment of constipation to be able to distinguish between costiveness consequent upon systemic or general causes and that which results from some obstruction interfering with the fecal current.

At times this is comparatively easy, but more frequently the examiner is called upon to exert all his patience and ingenuity in order to determine with which type of constipation he has to deal. Occasionally it is impossible to make a differential diagnosis, for the reason that the irregular and delayed evacuations result from both general and obstructive causes.

Acute obstipation is easily diagnosed because of its sudden onset and the alarming symptoms which accompany it, such as complete distention of the abdomen, cramps, nausea, fecal vomiting, cold extremities, pinched expression, fast thready pulse, exhaustion, and inability to obtain a movement of the bowels. Authorities on constipation have clearly described reliable methods to employ in the diagnosis of acute obstipation, but they have not been so successful in outlining the points of differentiation in chronic mechanical constipation; and neither have they indicated a way in which the latter can be distinguished from costiveness arising from atony, improper diet, irregular habits, lack of exercise, or a sedentary occupation.

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[1] Boas, *Diseases of Intestines*, second edition, p. 74, 1904.

I will not further discuss the diagnosis of acute obstipation, but will at once proceed to give the more common and reliable diagnostic points, which I have found useful in helping me to distinguish between the different forms of chronic constipation.

In order to simplify the subject I will first point out the distinguishing features of both chronic atonic and chronic mechanical constipation (obstipation), and will then call attention to the diagnostic points of the different types of obstructive constipation, so that the one may be readily differentiated from the other.

Chronic habitual (atonic) constipation is observed frequently in childhood and young adult life, and can very often be traced to heredity, careless habits, false modesty, improper diet, etc., while the mechanical form occurs most often in middle life or old age, begins suddenly, and may follow such conditions as ulceration of the bowel, a surgical operation, typhoid fever, appendicitis, peritonitis, or any inflammatory process which results in the formation of scars, strictures, tumefactions, or adhesions which interfere with the functions of the intestine.

Patients having ordinary or habitual constipation complain but little of discomfort or pain in the abdomen; whereas, those who suffer from the mechanical form frequently have great distention and colicky pains.

The pain in atonic constipation is more generally distributed, while that consequent upon a mechanical obstruction can usually be located at some definite point along the course of the large gut or in the center of the abdomen. In the habitual form there occurs at times more or less distention of the abdomen from gas which is evenly distributed, but in the mechanical variety of constipation the distention occurs more frequently and is often more pronounced, is confined to the part of the intestine above the obstructive point, causes a bulging of the abdomen on the affected side, and not infrequently results in dilatation, displacement, or paresis of the bowel, which adds materially to the gravity of the constipated state.

Sufferers from chronic habitual costiveness often have a sallow complexion and complain of mild digestive disturbances, but, as a general rule, they are fairly well nourished; while those afflicted with the mechanical form suffer from violent attacks of indigestion and the food is hurried undigested along the alimentary canal, owing to active and prolonged peristalsis, and in consequence this class of patients frequently become emaciated and exhausted; and when the obstruction is due to cancer they are cachectic.

Habitual constipation causes less disturbance to organs and structures near the bowel than does the mechanical variety, which not infrequently keeps them in a state of irritation through pressure or binding adhesions or tumefactions caused by a tumor, distention of the bowel through gas, or the extension to adjacent organs of inflammatory ulcerative or malignant processes originating in the gut. Again, the habitual form is rarely if ever accompanied by acute or chronic peritonitis or other infectious phenomena, whereas the way to infection may be paved by the conditions often accompanying the mechanical form, such as traumatism of the bowel, lesions of the blood-vessels, ulceration, and associated discharges.

In habitual constipation the patient is usually costive year in and year out, and the daily evacuation can be secured regularly by artificial means, but when the constipated state is consequent upon a cancer, stricture, angulation, volvulus, displaced gut or organ, or enterospasm and other forms of mechanical obstruction, the bowel may at one time move regularly, while at another time constipation prevails and is so obstinate that it is impossible to evacuate the bowel except when the feces are liquefied or softened by repeated cathartics or frequent copious high enemata of soap-suds or oil. Patients afflicted with habitual constipation feel relieved after a bowel movement, do not suffer from diarrhea, and the evacuations appear normal or contain a slight amount of mucus; while, on the contrary, those suffering from mechanical obstruction often complain of straining, unrelieved sensations after an evacuation, occasionally diarrhea alternating with constipation, and the stools contain considerable mucus and blood, pus, fragments of tissue, or pigment in cases where the obstruction is due to cancer, stricture, or other pathologic conditions accompanied by ulceration. Again, in the habitual form, except when complicated by impaction, the patient rarely complains of sensations of weight, fulness, and bearing-down pains in the bowel, nor of the manifestations which accompany partial or complete intestinal obstruction, while in the mechanical type all these symptoms may be present at one time or another.

Purgation usually gives relief in atonic constipation, while in the mechanical type it not infrequently increases the patient's suffering by exciting peristalsis and fails to secure the desired evacuation because the feces are unable to pass the occlusion. Again, small enemata will prove effective in the former, while in the mechanical type they must be given more often and in larger amounts in order to permit the feces to escape, except when the obstruction is located in the rectum. In habitual costiveness the patient does not complain of local soreness and is of the opinion that the entire bowel is inactive, but in the obstructive form the passage of the feces over certain parts of the gut causes discomfort or pain, and because of this and the fact that the feces are arrested regularly in a certain section of the intestine, the patient volunteers the opinion that the trouble is caused by a cancer, stricture, or some other condition which blocks the bowel at a *definite* point.

The evacuations in cases of habitual constipation are usually of semisolid or firm consistence and are discharged in the form of large round cylinders, the lowermost end of which is compact and has an irregular nodulated surface, though occasionally they may be evacuated as round nodulated masses, while the stools of mechanically constipated patients are often of fluid or mushy consistence, or they are evacuated as bullet-like scybala having a foul odor and covered with moist or inspissated mucus, or they may be semisolid in consistence and unnatural in shape, and voided as short or long pipe-stemmed, ribbon-like, or grooved pieces.

Cases of atonic constipation complicated by recurring fecal impactions which cause enteroptosis, angulation, and twisting of the gut may be impossible to differentiate from mechanical costiveness, for the reason that the manifestations of the two conditions are now so intermingled that it is difficult to separate them. Again, it is well to remember that in the earlier stages of mechanical constipation it is almost impossible to distinguish it from the habitual variety, because the symptoms of the former are not sufficiently pronounced. In uncomplicated cases of atonic constipation the bowel is usually normal in location, size, and contour, but the reverse is true in the mechanical variety, and the abnormal conditions can be demonstrated by careful palpation or by distending all or part of the colon with gas or water; finally, indicanuria is less marked in habitual constipation than in the obstructive form.

DIFFERENTIAL DIAGNOSIS BETWEEN THE VARIOUS TYPES OF MECHANICAL CONSTIPATION

Having outlined the differential diagnosis between chronic habitual and mechanical constipation, I will now discuss the essential features in the diagnosis of the different types of *obstructive* or surgical costiveness; after which I will give the diagnostic points of chronic constipation arising from disease in the anorectal region.

Chronic costiveness arising from mechanical obstruction of the *small intestine* is of very unusual occurrence, but mechanical interference with the passage of the feces is not uncommon in the *colon*, *sigmoid*, and *rectum*. In the small gut it is rare, for the reason that the feces are liquid, and can get by the obstruction in quantities sufficient to permit the patient to have a daily evacuation; while in the colon the excrement is more solid and is apt to collect above the obstructive point. The following are the most common forms of mechanical constipation: Congenital deformities; extra-intestinal pressure; benign and malignant neoplasms; foreign bodies; fecal impaction, diverticula, rectocele, deviated coccyx, adhesions and tumefactions, angulations, paralytic ileus, abnormal mesentery, hernia, enterospasm, enteroptosis, intussusception or invagination, dilatation, hypertrophy of O'Beirne's sphincter, the rectal valves, the levatores ani, and sphincter muscles.

Owing to the similarity of the symptoms produced by the different types of mechanical constipation, it is extremely difficult at times to make a differential diagnosis. The manifestations of obstructive costiveness have already been given in the chapter on the Symptomatology of Constipation and will not be repeated here, except where a symptom is peculiar to a particular form of mechanical constipation and thus assumes diagnostic importance.

Congenital deformities of the colon other than displacement are rarely diagnosed with certainty. Mechanical obstruction from this cause should be suspected in the newborn when it is impossible to secure an evacuation, the abdomen becomes distended, the pulse fast and thready, there are signs of exhaustion, and the baby is restless and cries continuously. In order to avoid a mistake in diagnosis the rectum and anus should be carefully examined with the finger and proctoscope to determine if they are normal, and a catheter or colon-tube should be introduced into the sigmoid and colon in order to locate the seat of the obstruction if possible. If the diagnosis still remains in doubt, the bowel should be inflated, percussed, and palpated; and if the cause of the trouble cannot then be determined, exploratory laparotomy becomes imperative.

In cases of congenital displacement and enlargement, as the child grows older, it will complain of digestive disturbances, distention from gas, and costiveness. By obtaining a careful history and practising percussion and palpation, a diagnosis can in most instances be made. When these fail, intelligent inflation of the gut will clear up the diagnosis.

Congenital deformities of the rectum or **anus** should be suspected in the newborn when there is constipation or complete obstipation, complicated by abdominal distention, fast pulse, shock, restlessness, and constant crying of the little patient. The diagnosis in this class of cases can under ordinary circumstances be quickly cleared up by making a visual and digital examination of the anus and rectum, one or the other of which will be found partially or completely occluded by a membranous partition or fibrous band extending across and obstructing the passage of the feces.

Extra-intestinal pressure may be easy to diagnose in one case and difficult in another, owing to the various conditions which produce it. Naturally one would be on the lookout for this condition in persons having obstinate constipation, who had previously suffered from some acute or chronic inflammatory process, or who had undergone a surgical operation, which factors might lead to a constriction of the intestine as the result of adhesions or tumefactions. By carefully inspecting the abdomen, bulging caused by local impactions or enlarged, displaced, or distended organs are discernible which would account for the trouble. When no information is to be gained in this way, one should resort to palpation and percussion in order to discover neoplasms and diseased organs, or loops of the gut, which might constrict or press upon the intestine; and when negative results are obtained, the bowel should be promptly filled with water or gas in order to distend and lift it up, when by means of palpation one will be able to distinguish between tumors in the bowel and neighboring organs, and growths elsewhere in the abdomen. Inflation is also of assistance in locating the obstructive point by making the section of gut below stand out more prominently than that above. Occasionally tumors which have been overlooked can be discovered by having the patient change from one position to another while palpation is being made.

Strictures can in many instances be correctly diagnosed by getting a history and noting the symptoms characteristic of this affection, which have been given elsewhere. If the patient is suffering or has suffered from any acute or chronic ulcerative or inflammatory disease of the intestine, and complains of obstinate constipation and fecal impaction, with occasional attacks of diarrhea, bearing-down pains, sensations as of a stoppage at a certain point, and constant desire to evacuate the bowel, with frequent discharge of pus, blood, and mucus, one is justified in suspecting stricture. Strictures of the colon and upper sigmoid are at times difficult to diagnose accurately, but in most instances, if a little patience and ingenuity be exercised, and the bowel be carefully palpated, both in the empty and distended state, the constriction, especially when complicated by fecal impaction, can be discovered.

Constrictions located in the lower sigmoid, rectum, and at the anus can always be easily located and studied at close range by means of the finger or through the proctoscope or sigmoidoscope. Bougies have become almost obsolete as an aid in the diagnosis of stricture in the practice of competent men because of the superiority of the tubes, and, further, because of the many deaths from rupture of the bowel above the peritoneal attachment following the indiscriminate use of the bougie in this class of cases; but a sound may be employed to advantage occasionally (Fig. 78).

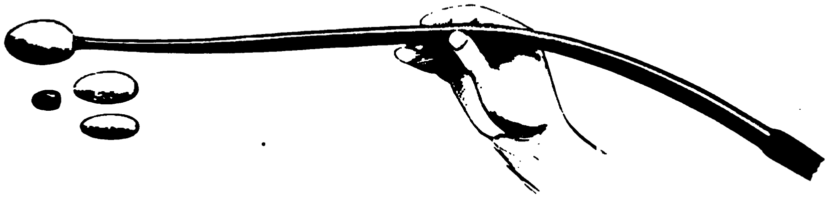

Fig. 78.—A useful sound for locating strictures and foreign bodies in the sigmoid flexure and upper rectum.

Malignant and **non-malignant tumors** of the large bowel, when of sufficient size to induce obstructive constipation, are accompanied by practically the same manifestations as stricture in this locality from other causes, and the methods required to make a diagnosis are almost identical in the two conditions.

Patients having advanced cancer suffer from cachexia, great pain in the neighborhood of the growth, discomfort in neighboring organs, copious discharges of pus, blood, and mucus; and the evacuations, which have a characteristic disgusting odor, may contain dark pigment or fragments of tissue. Malignant growths are easier to diagnose than strictures and benign tumors because of their larger size, involvement of distant glands or organs, cachectic appearance of the patient, the increased pain, and the rapid loss of weight which accompany this disease. Cancer of the rectum more frequently occurs within 3 or 4 inches of the anus, consequently, the tumors can be located by the finger and then carefully inspected through the proctoscope, in order to determine the presence and degree of ulceration and to remove a section for microscopic study if desirable.

Chronic fecal impaction has on several occasions been mistaken and operated on for colonic and rectal cancer, yet such a mistake is unlikely when a careful examination is made by an astute observer. To obviate such a calamity at the hands of the inexperienced I have arranged the following table, which gives in parallel columns the cardinal diagnostic features pertaining to each of these two conditions:

Differential Diagnosis Between Fecal Impaction and Carcinoma of the Large Intestine

	Fecal Impaction.	*Carcinoma.*
1.	Single, large, firm, and globular in shape; or numerous, small, hard, and nodular.	Two or more dense, rounded tumors.
2.	Usually not covered by mucous membrane.	Covered by mucosa except when ulcerated.
3.	Occupies lumen of the bowel.	Projects into the lumen of the intestine.
4.	Of doughy consistence and indentable.	Hard and non-indentable.
5.	Not attached.	Attached.
6.	Movable.	Non-movable or slightly so.
7.	Occurs at any age.	In middle life and old age.
8.	No cachexia.	Cachexia.
9.	Usually odorless.	Offensive odor.
10.	Comes on suddenly.	Slowly.
11.	No previous history of pain or hemorrhages.	Pain always, hemorrhages frequently.
12.	Not accompanied by discharge of mucus or jelly-like stools.	Free discharge of mucus and sometimes of jelly-like evacuations.

The symptoms common to both impaction and carcinoma are constipation in the beginning, diarrhea later, straining, frequent micturition, tumor, and reflected pains.

Foreign bodies in the colon or sigmoid flexure, when of sufficient size or irregular in shape, may act as a nucleus around which the feces collect and may delay the evacuations. This type of costiveness is prone to occur most frequently in persons over fifty years old, is more common in women, and may be the result of either gall-stones, enteroliths, balls of hair, avenoliths (oat-stones), fruit seeds, cherry pits, and other hard indigestible substances which have been swallowed. It is at times extremely difficult, if not impossible, to differentiate between an obstruction induced by a concretion from that arising from other causes. In attempting a diagnosis it is important, especially in children, to find out what has been eaten in order to determine if the trouble is possibly due to a collection of seeds or fruit stones. In middle-aged and elderly people it is necessary to inquire if the patient has had an attack of jaundice or colic, or has passed any small stones with the evacuations, and in this way form some idea as to whether or not we have to deal with gall-stones; and, finally, it is necessary to find out if the patient has swallowed a bone or other foreign body which might cause the occlusion. In cases of constipation which are thought to be due to foreign bodies, it is necessary to direct the examination principally to the large intestine, because objects of this kind which can escape from the stomach usually pass the small intestine in safety, to become lodged in the cecum, sigmoid flexure, or rectum.

Intestinal foreign bodies invariably cause more or less distention and discomfort in the region where they are located, but when angular they are accompanied by agonizing tearing pains or cause enterospasm periodically, during which time there may be meteorism, obstipation, nausea, and vomiting.

Foreign bodies situated in the colon are diagnosed in a manner somewhat similar to that used for determining the presence of tumors and strictures, but too much importance cannot be placed on the value of the history, physical examination, and macroscopic and microscopic examination of the feces in these cases. Foreign bodies in the rectum do not offer so many obstacles to correct diagnosis as when situated higher up, for the reason that when located in these regions they can be determined with relative facility and accuracy by means of digital and instrumental examination.

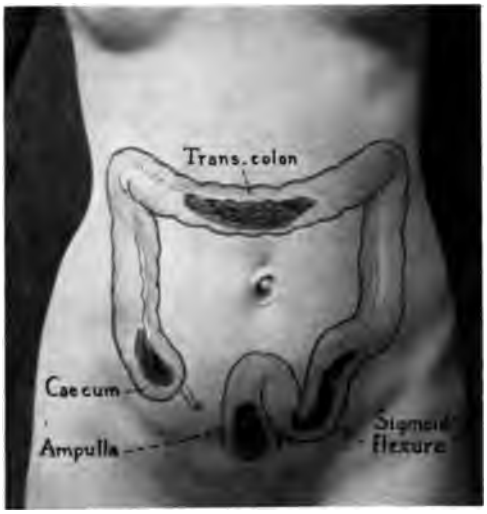

Fig. 79.—Showing the most common locations of fecal impaction, named from below upward.

Fecal impaction of the colon occurs most frequently in the cecum, sigmoid flexure, and transverse colon (Fig. 79), and may arise without apparent cause or be the result of some other obstructive condition. In cases of coprostasis, where the feces have collected in enormous quantities and are mushy or semisolid in consistence, or where they have accumulated in single or multiple bulky masses composed of large or small scybala, the diagnosis is easily made. In such cases the patient will say that the passages have been delayed for a considerable time or have been too small in quantity, and he will complain of gas pains, frontal headache, anemia, poor appetite, lassitude, indigestion, insomnia, and various nervous phenomena, as well as sensations of weight, fulness, and dragging pain in some particular part of the bowel. With this history we should suspect fecal impaction and should proceed carefully to inspect, percuss, and palpate the abdomen along the course of the colon, in order to locate the masses. Occasionally, when the abdomen is thin, the accumulations cause local bulgings. As a general rule, it requires an accumulation of considerable proportions to cause obstipation, but it is well to remember that a very small nodular fecal mass when located in a narrow part of the bowel, at one of the flexures or at O'Beirne's sphincter, may induce obstinate constipation by blocking the bowel or exciting enteric spasms.

The pain from a fecal impaction is local and interrupted when it is small, but becomes continuous and diffuse as the accumulation grows larger.

Owing to the ease with which the masses can be discovered, fecal impaction is less difficult to diagnose than some of the other varieties of mechanical obstruction, and yet the task is not always an easy one. It must be borne in mind that tumors of the intestine, bladder, vagina, uterus, tubes, ovaries, and prostate sometimes produce obstructive constipation and a long train of symptoms similar to those which accompany coprostasis. This condition is most frequently mistaken for carcinoma, and this is especially apt to be the case when the mass has caused the bowel to become invaginated. With care, a fecal tumor can be differentiated from a malignant neoplasm of the colon by its doughy consistence, indentability, and the fact that it can be moved up and down the bowel, in conjunction with the absence of the characteristic symptoms of cancer elsewhere. Recourse should be had to laxatives and oil injections, which will dislodge the tumor if it be composed of feces. In some cases, however, where the mass becomes encysted, it may be necessary to open the abdomen and inspect the gut in order to clear up the diagnosis.

Angulation.—The diagnosis of intestinal angulation is always difficult and sometimes impossible without opening the abdomen. One can easily decide by means of palpation and inflation that the bowel is obstructed and also the point where it is blocked, but it is another matter to determine whether this is due to angulation, twisting, or adhesions.

The majority of kinks which occur in the colon are located in the sigmoid flexure or at its junction with the rectum, and when such is the case a diagnosis can be made more quickly and positively because they can be reached and examined through the sigmoidoscope or by the introduction of bougies or sounds.

In addition to obstipation, persons who suffer from acute bends in the lower bowel complain of left-sided local tenderness and pain similar to that induced by sigmoiditis and perisigmoiditis, and when a digital examination is made sausage-shaped fecal accumulations can invariably be felt in Douglas' pouch or the rectovesical fold (Fig. 80).

Angulations can usually be differentiated from strictures, tumors, and other forms of obstruction by the introduction of a flexible bougie, which can be made to pass the bends, while this is not possible in the case of a tumor or stricture which induces the same degree of obstruction.

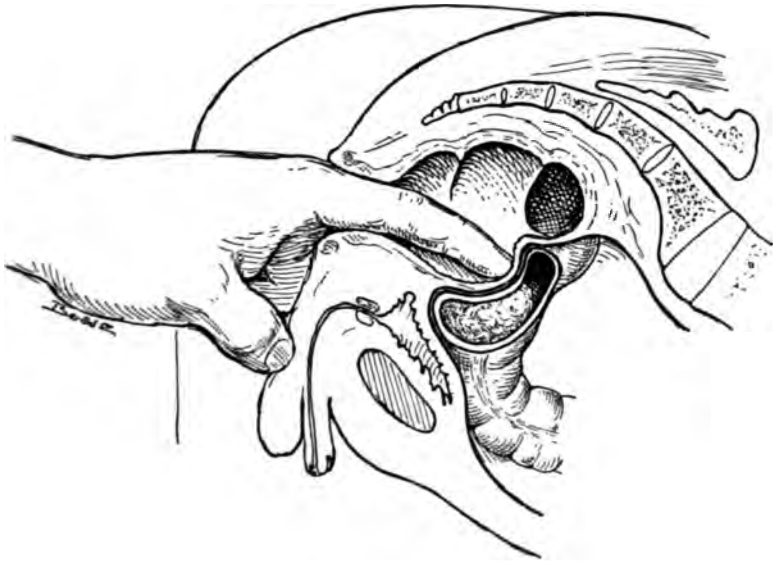

Fig. 80.—Method of detecting retained feces resulting from ptosis or angulation of the sigmoid flexure.

Diverticula are among the rarer mechanical causes of constipation, and because of this and the fact that they do not produce distinctive manifestations, they are sometimes overlooked. Rectocele and diverticula of the lower rectum can be located with little difficulty with the finger or proctoscope, or by careful palpation, especially when they are distended with feces. In women they cause a bulging of the anterior rectal wall, and are readily seen or felt. When situated very high, and not recognizable by palpation or with the sigmoidoscope, an exploratory incision is indicated to clear up the diagnosis.

An **abnormally short mesentery** or adhesion should be suspected when the patient suffers from obstipation, with localized abdominal pain while bending or changing from one posture to another, and when the feces are inclined to collect in a certain part of the colon, and are not essentially helped along by mild cathartics. Occasionally, adhesions can be distinguished by palpation, and angulations by the introduction of a flexible bougie, or by inspection through a sigmoidoscope. The location of these types of obstruction can be accurately determined by distention of the bowel with air, gas, or water, followed by palpation along the colon.

We may suspect that the gut is angulated, but in many instances celiotomy is necessary to determine if the trouble arises from this source or from an elongated mesentery, which allows rotation of the gut, or from one or more adhesions which pull or press upon the bowel. Gas pains are a common feature of these conditions.

Volvulus (chronic), partial or complete, is likely to occur anywhere along the colon when the gut is very long or has considerable mobility, but it is encountered more frequently in the region of the sigmoid than elsewhere. Half or complete twists of the bowel, when fixed by adhesions, produce permanent and obstinate constipation, but when the twist untwirls itself as the patient changes his position, or when the feces are driven through it, costiveness is less marked at one time than another.

Volvulus is ordinarily accompanied by periodic attacks of pain and tenderness at some particular point, nausea, occasional vomiting, obstipation, and restlessness. By means of inflation the twist can be located, and by palpating this region a swelling can often be made out, as well as the distended gut, above the occlusion. When this fails, direct inspection is necessary to clear up the diagnosis.

Hernia is accompanied by practically the same manifestations as volvulus. After these have been ascertained and the various hernial apertures have been examined without showing cause for the trouble, the performance of celiotomy is justifiable.

Invagination and **intussusception** may take place in any part of the large bowel under varying conditions, but is especially frequent as a complication of ptosis of the sigmoid.

The type of invagination with which we have to deal here obstructs the fecal current sufficiently to cause chronic constipation, but does not occlude the bowel enough to induce the acute obstruction so frequently encountered in children. The gut, because of its great length and detached condition, may be felt to descend into the rectum during defecation, and then, after a shorter or longer time in some cases, may or may not spontaneously draw itself upward; while in other instances invagination may be induced by a fecal mass which drives a part of the sigmoid into the rectum, where it remains until the mass is dislodged.

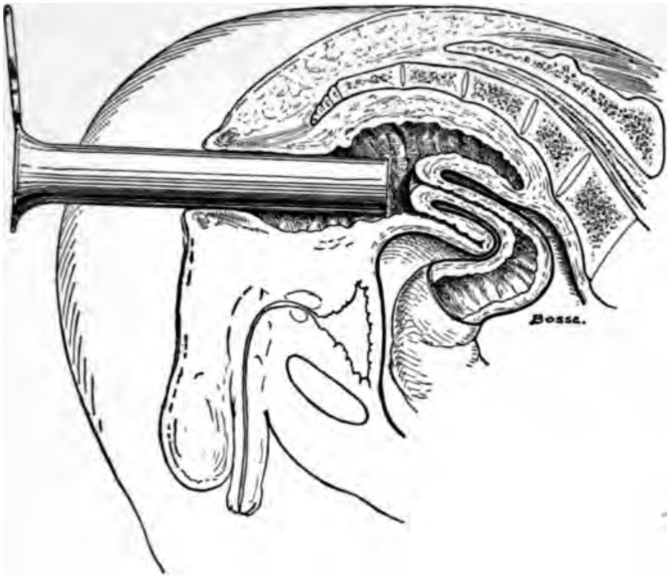

Fig. 81.—Showing appearance of invaginated sigmoid, as seen through the proctoscope.

The degree of costiveness and the amount of suffering induced by invagination depend largely upon the length and condition of the telescoped gut (Fig. 81) and the permanency of the intussusception.

CHAPTER XIII

DIAGNOSIS (*Continued*)

Intestinal Ptosis.—Ptosis of the colon is not so difficult to recognize as many who are not accustomed to be on the lookout for it suppose; though I must admit that when there is a slight displacement of but a single part of the bowel it is not always easy to detect. In Glénard's disease, where all the viscera have descended below their normal level, the diagnosis is more easily made because of the symptoms complained of by the patient and the marked displacement of the gut noticeable in this class of cases. Patients having extensive ptosis of the colon always suffer from obstipation, extreme nervousness, frontal headache, insomnia, loss of appetite, malnutrition, emaciation, anemia, tympanites, disturbed circulation, with the pulse faster in the erect than in the recumbent posture, backache, localized pulling pains, flabby muscles, pendulous abdomen, dilatation of the intestine, colitis, intestinal atony, obstinate constipation, often complicated by fecal impaction, which drags the bowel well down into the pelvis.

In addition to the symptoms just named, they suffer from soreness, weight, fulness, and recurring fecal impaction in the part or parts of the bowel which have become displaced. Not infrequently it happens that one of the flexures, the cecum, transverse colon, or sigmoid flexure, masses up in the pelvis, where it becomes fixed through adhesions formed as a result of an extension of the inflammatory process, caused by the continued damage to the bowel, and may be felt above or below the umbilicus, giving rise to confusion with neighboring organs or tumors in this region. When familiar with the history and symptoms, it is an easy matter to make a diagnosis with the aid of inflation, percussion, palpation, and the *x*-ray. When the abdomen is thin and flabby, one can frequently feel the gut in its unnatural situation, or can detect it either in the empty or distended state by the method just suggested. The feces accumulate in the descended angular part of the fallen bowel, and are a great aid in the diagnosis by helping to determine the part of the bowel involved and the degree to which it has fallen. In women who have borne children it is well to examine the recti muscles, to see if they are separated and, if so, to what extent.

Ptosis of the sigmoid flexure occurs frequently and may or may not be associated with displacement of other organs. This type of ptosis causes the most obstinate form of constipation, and the feces repeatedly collect in the sigmoid flexure, where they cause weight, fulness, local tenderness, and dragging pains, with discomfort in the pelvic region. Patients asked to locate the trouble invariably point to the left iliac or pelvic regions, and say that the excrement cannot get by that point, and that unless medicine or enemata are used to make the feces fluid they are unable to reach the rectum and be expelled.

By digital or bimanual examination the overloaded sigmoid, containing semisolid or nodular feces, can be felt prolapsed into Douglas' or the rectovesical pouch; or, by placing the patient in the knee-chest posture, the fecal accumulations can be inspected through the sigmoidoscope.

Owing to the displacement and angulations of the bowel which accompany ptosis of the colon, water introduced into it has a tendency to remain there indefinitely.

In intermittent cases the bowel at times may act with regularity, but when the invagination persists, continuous and obstinate constipation prevails. These patients complain of a desire to empty the bowel, but defecation gives no relief; for the reason that the sigmoid piled up in the rectum gives the sensation of something still there to be expelled, and repeated attempts to evacuate the bowel simply result in a discharge of mucus.

This class of patients complain of dragging, colicky pains, a bulging in the region of the sigmoid flexure, slight nausea, vesical disturbances, and, on assuming the recumbent posture, a disagreeable sensation as if the bowel were slipping back into the pelvis, together with inability to secure an evacuation sometimes for days or weeks, even with the aid of the most reliable artificial means.

This condition can be positively diagnosed by digital examination and the use of the proctoscope and sigmoidoscope. After the introduction of the sigmoidoscope, as it is slowly withdrawn, the gut can be seen to *prolapse* and follow it to—and sometimes through—the anus. If the finger is now introduced into the rectum, it at once comes in contact with the mass of gut contained therein. In cases where the amount of bowel involved in the invagination is not too extensive, it presents an appearance not unlike the cervix when inspected through the proctoscope.

Very often, when the bowel is invaginated into the rectum, if the patient is placed in the knee-chest posture, it can be seen gradually to recede, and as it does so the discomfort and rectal tenesmus are relieved.

Finally, it is always important in these cases to find out if the patient suffered as a baby from rectal procidentia, for I am convinced that invagination is frequently congenital.

Paralytic Ileus.—The recognition of paralytic ileus is relatively easy after the performance of a laparotomy or other major abdominal operation, when the symptoms of intestinal occlusion, with enormous distention from gas, appear in a patient who has hitherto progressed satisfactorily, and refuse to yield to measures instituted for their relief. In certain other cases the diagnosis may present insuperable diagnostic difficulties, especially when the condition is referable to peritonitis.

Dilatation of the colon, owing to the increased size of the gut and pressure of gas, can, as a general rule, be diagnosed without much difficulty by thorough percussion and palpation of the abdomen and the gut, both in the distended and the empty state, aided by digital and sigmoidoscopic examination. The extent of the dilatation, as well as the degree of displacement of the bowel, can in this way be determined, especially if studied in connection with the symptoms which accompany this condition, as pointed out elsewhere. In these cases enormous collections of feces can usually be detected by palpation, and when the dilatation is due to obstruction, it can be located in the same manner.

Megacolon, *giant growth* of the *colon*, and *Hirschsprung's disease* are diagnosed in a manner similar to that just described, after a history from birth is obtained.

Enterospasm may be placed among the rarer forms of constipation. The contractions of the gut may occur at frequent or long intervals, and last but a few moments or several hours or days; consequently, the degree of constipation varies at different times. During attacks of enterospasm the patient suffers intensely, the abdomen becomes distended, and the involved part of the bowel, upon deep pressure, feels like a narrow rigid tube; the feces when finally discharged have a mucous covering and a string-like, pipe-stem appearance. Inflation and palpation helps to locate and outline the contracted segment of bowel. The presence of enterospasm should be suspected whenever the patient has intermittent constipation and passes large quantities of mucus.

Intestinal Parasites (Entozoa).—The diagnosis, as a rule, presents no difficulties, especially with the assistance of the proctoscope, after careful local examination (separation of the anal folds). The feces should be subjected to both macroscopic and microscopic examination, to determine the presence of entozoa or their ova.

DIFFERENTIAL DIAGNOSIS OF CONSTIPATION ARISING FROM DISEASES OF THE ANUS, RECTUM, AND SIGMOID FLEXURE

In persons suffering from chronic constipation it is unwise to venture an opinion as to the cause or causes of the trouble until the anus and surrounding parts have been carefully *inspected* and *palpated*, *a digital examination* of the lower bowel has been made, and the rectum and sigmoid flexure have been inflated and thoroughly *inspected* through the *proctoscope* and *sigmoidoscope*.

The most favorable *positions* for examination of the buttocks, anus, and lower rectum are the *semiprone* or *Sims'* and *lithotomy* postures; while for inspection of the rectum and sigmoid flexure, after the bowel has been inflated, the knee-chest position is preferable.

Inspection enables one to observe readily whether or not the anus is inflamed or tight, and if there are hemorrhoids, fissures, erosions, scars, or tumors, which would excite sphincteralgia, occlude the anus, or in other ways interfere with the discharge of the feces, causing constipation. In this manner the presence of skin tags, venereal warts, thickened folds of skin, and excoriations can be noted, and some idea formed as to whether or not there is some more serious condition higher up in the rectum.

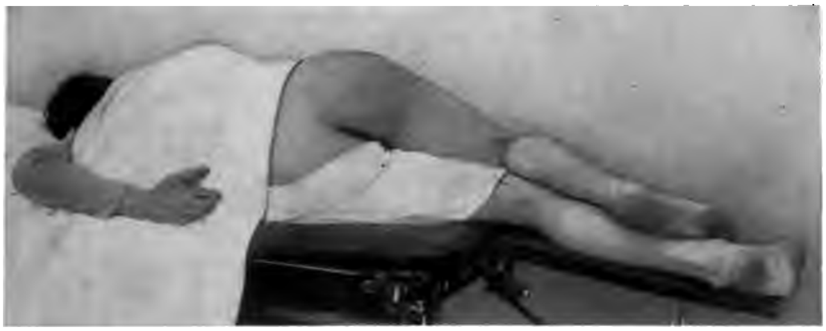

Fig. 82.—Correct Sims' posture for rectal examination.

Palpation enables one to locate tumors, abscesses, fistulous tracts, an inflammatory thickening in and about the rectum and anus, which may possibly interfere to a greater or less degree with the regularity of the stools.

Digital examination (with the patient in the Sims'—Fig. 82—or lithotomy posture) is the most reliable method at our command for detecting disease in the lower bowel; and much valuable information can be obtained by means of the educated finger (Fig. 83). In this way one can easily and quickly diagnose fissures, ulcers, polyps, cancers, strictures, fecal impaction, foreign bodies, hemorrhoids, hypertrophy of the rectal valves and of the levatores ani and sphincter muscles, thickening and rigidity of the bowel wall, diverticula, enlargement of the prostate, retroflexion of the uterus, deviated coccyx, and other conditions, which alone or together impede the feces in their downward course.

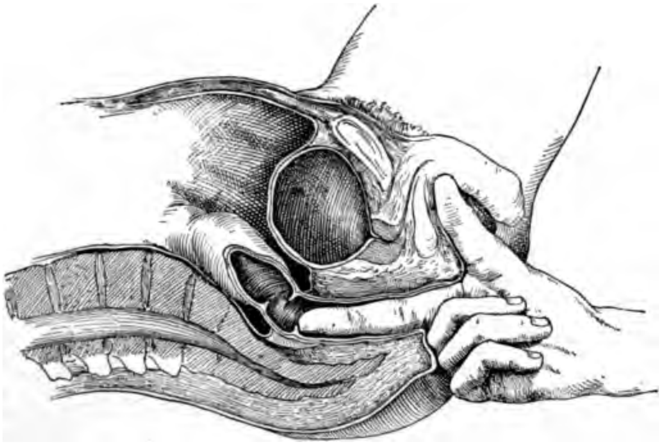

Fig. 83.—Correct method of digital examination with the patient in the lithotomy posture.

Digital examination, when properly executed, causes but little discomfort, but when the finger is hurriedly and carelessly introduced into the bowel it induces much unnecessary suffering. The nail should be pared, the finger oiled with some stiff lubricant, such as vaselin, and passed slowly through the anus with a gentle boring motion. When the sphincter contracts, a few seconds should be allowed for relaxation to take place; the examination may then be continued by sweeping the finger around the bowel, first in one direction and then in another. The condition of the sphincter, surface of the mucosa, prostate gland, uterus, bladder, vaginal septum, sacrum, and coccyx may in this way be determined.

Proctoscopic and **sigmoidoscopic examination** permits a positive diagnosis of pathologic conditions situated in the upper rectum and sigmoid flexure, which was impossible before the advent of the proctoscope and sigmoidoscope. By their aid it is now as easy to diagnose disease in these regions as it is in the nasopharynx. Force should never be used in the introduction of these instruments, otherwise there is danger of rupturing the bowel. I have had one such accident and other similar cases have been reported. The rupture, in most instances, occurs in the sigmoid flexure, between its two fixed points. It requires considerable practice in order to properly and painlessly introduce the proctoscope and sigmoidoscope, and the correct *knee-chest* posture (Figs.

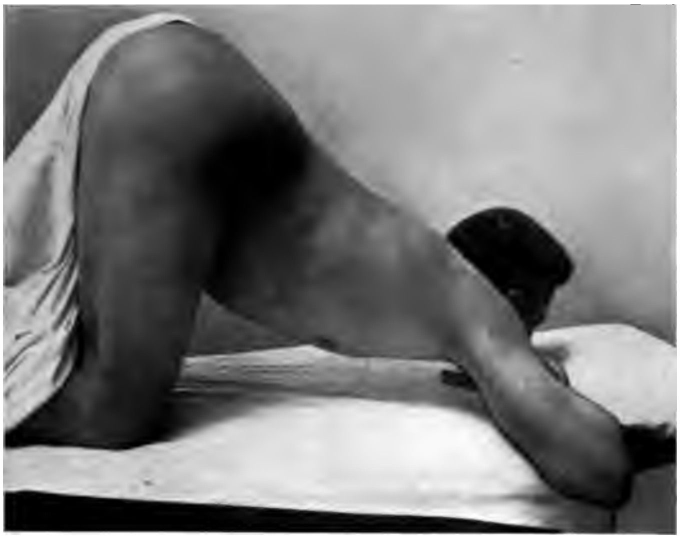

Fig. 84.—Correct genupectoral posture for proctoscopy.

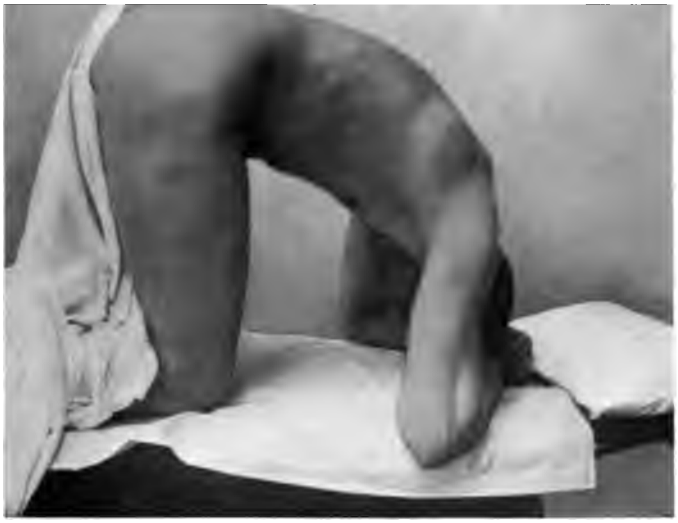

Fig. 85. Incorrect genupectoral posture for proctoscopy.

84, 85) is absolutely essential in order to secure the desired amount of inflation, except when the instrument used has a glass-cap covering and a bulb attachment for inflating, in which case the patient may be placed in Sims' position.

For the performance of a proctoscopic and sigmoidoscopic examination the patient is placed in the genupectoral position (Fig. 84), the proctoscope or sigmoidoscope is oiled and introduced into the rectum, and directed downward and forward until it passes through the anal canal—about 2 inches (Fig. 86). It is then pointed upward and backward until the promontory of the sacrum is reached (Fig. 87), when

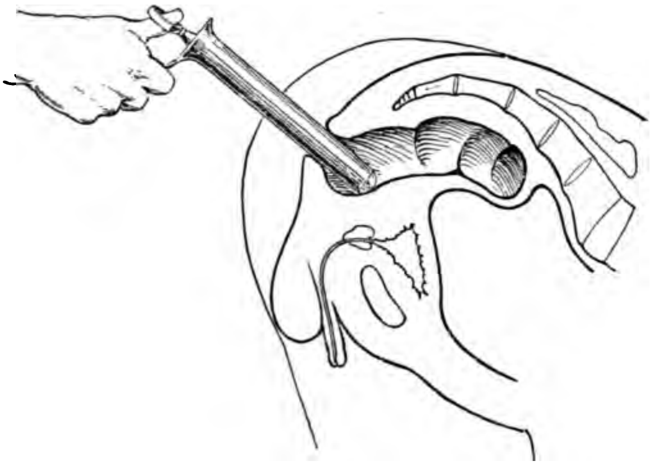

Fig. 86.—Showing method of introducing the proctoscope: First step.

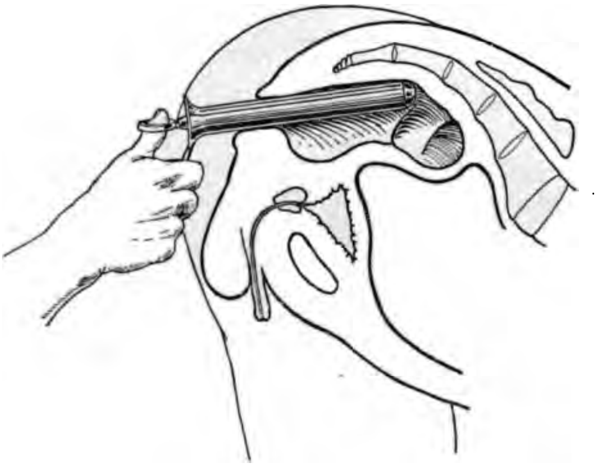

Fig. 87.—Showing method of introducing the proctoscope: Second step.

it is again directed downward and forward over the upper rectal valve and into the sigmoid flexure (Fig. 88). The obturator is then removed and the air permitted to rush in and dilate the bowel. When this has been accomplished, the sigmoid is examined; and as the instrument is slowly withdrawn a perfect view of every part of the rectum can be obtained. In this way one can with accuracy discover any and all pathologic conditions which might in any way obstruct the bowel or otherwise delay the evacuations.

When the air does not dilate the sigmoid flexure, a pneumatic sigmoidoscope should be introduced, with the obturator in place, until the middle valve has been passed. The obturator is then removed, and the rectum and bowel higher up is inflated and studied step by step, by pressing the bulb from time to time, as the instrument is passed higher up. In this way a splendid view is obtained and any obstruction within the rectum or sigmoid may be easily and accurately located and examined. For this purpose Sims' position is the most comfortable one for the patient to be placed in. With the ordinary instruments reflected light is employed, but with the pneumatic, a small lamp is placed on the inside or outside, at the end of the tube, to provide the necessary illumination. These instruments come in various sizes and lengths. Those most generally employed are 4, 8, and 14 inches in length and a little less than 1 inch in diameter.

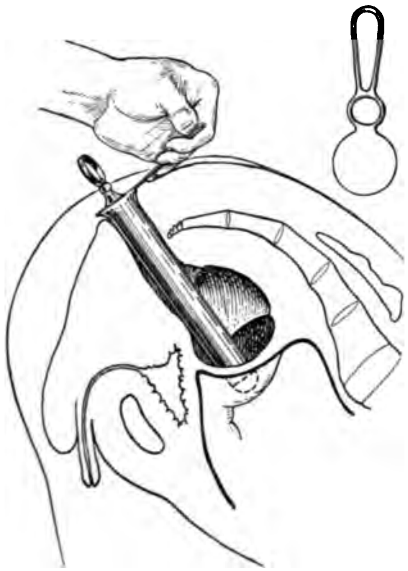

Fig. 88.—Showing method of introducing the proctoscope: Third step.

The ordinary **sigmoidoscope** or **enteroscope** was introduced by Bodenhamer, and the Kelly (Fig. 89) and Martin (Fig. 90) modifications are just as effective for ordinary diagnostic purposes as the more expensive and complicated instruments upon the market. The pneumatic proctoscope was devised practically at the same time by Laws (Fig. 91) and Pennington, and has been modified by Tuttle (Fig. 92), Beach, and others.

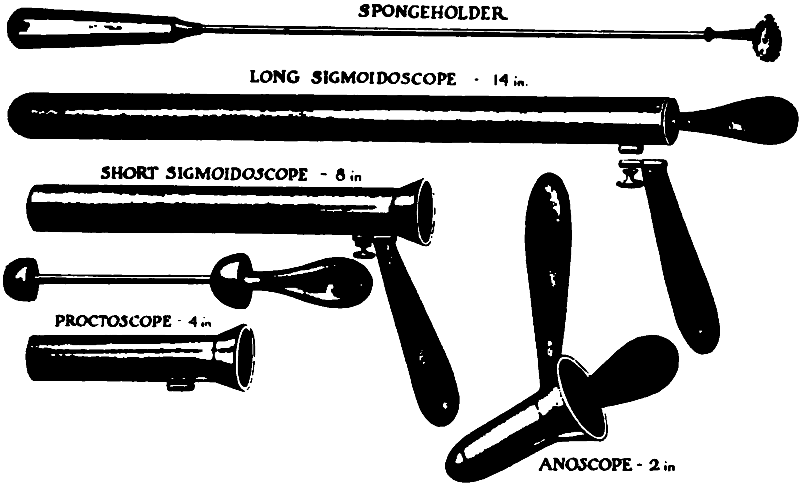

Fig. 89.—Kelly's instruments.

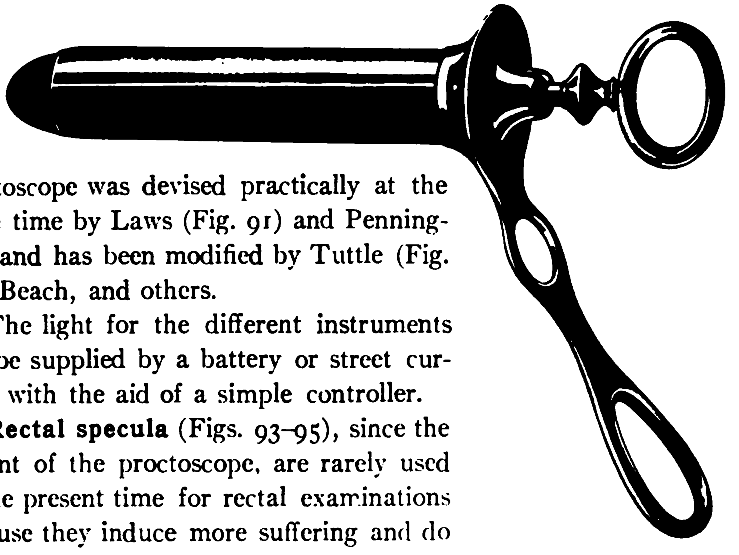

Fig. 90.—Martin's proctoscope.

The light for the different instruments can be supplied by a battery or street current, with the aid of a simple controller.

Rectal specula (Figs. 93–95), since the advent of the proctoscope, are rarely used at the present time for rectal examinations because they induce more suffering and do not give as good a view of the parts as do tubular instruments (proctoscopes). I rarely employ them except to probe blind internal fistulæ and to avert hemorrhoids for examination or operation. As generally used, the rectal speculum is the most brutal instrument yet devised.

It now remains to give the differential diagnosis of the diseases

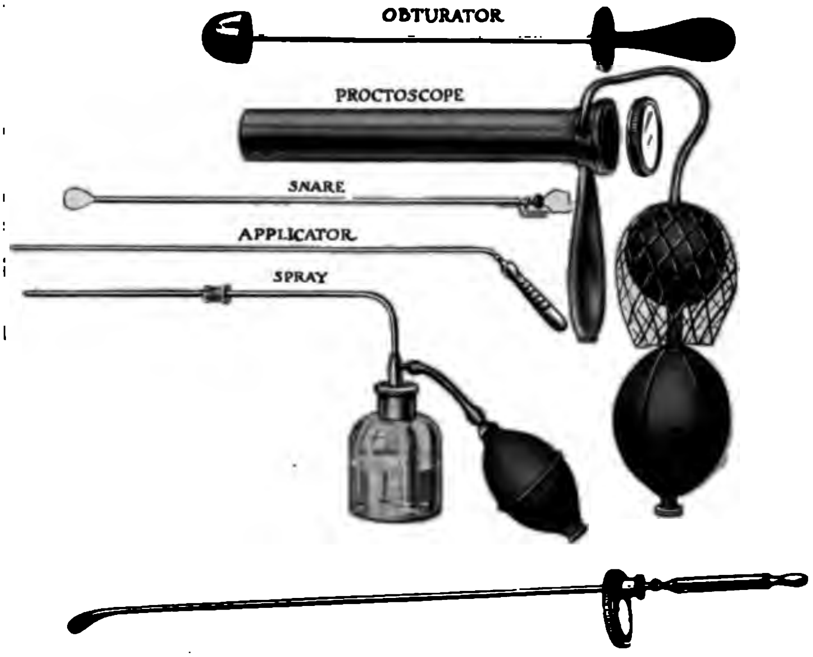

Fig. 91.—Laws' proctoscope.

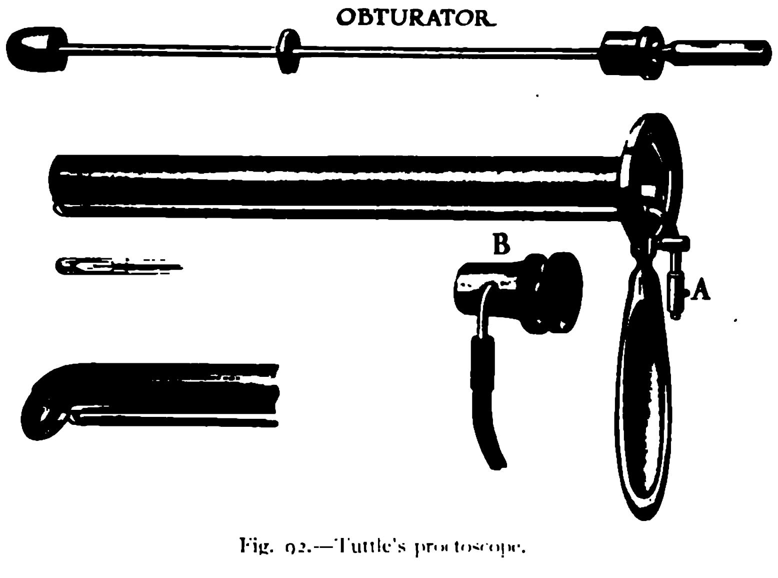

Fig. 92.—Tuttle's proctoscope.

of the anorectal region which tend to cause or aggravate constipation, and which have been mentioned in the chapter on Etiology.

Hypertrophy of O'Beirne's sphincter, causing coprostasis, is difficult to differentiate from enteroptosis on account of the similarity of the symptoms. Soreness and tenderness on pressure at the rectosigmoid juncture, with sensations of arrest at this point, together with a tendency of the feces to collect in the sigmoid flexure and remain there for days, without producing any desire to evacuate the bowel, are the cardinal features. The accumulation can be felt in the rectovesical or Douglas' pouch. The strongest cathartics are required to keep the bowel open, or large quantities of water must be injected to dislodge and wash out the feces. Owing to the irritable condition of the sphincter and its tendency to contract from slight causes, it is very difficult to introduce the colon-tube or the sigmoidoscope until after the muscle has been soothed by hot fomentations.

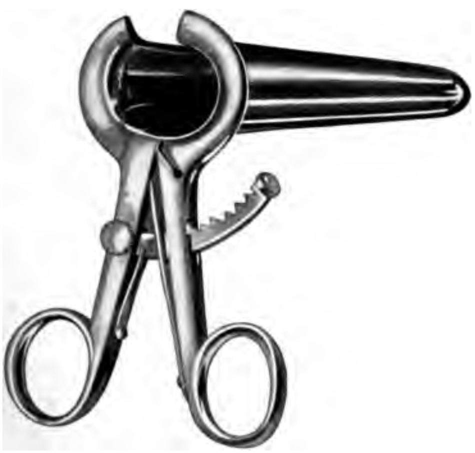

Fig. 93.—Author's examining speculum.

By means of the sigmoidoscope or proctoscope the parts in the immediate vicinity of O'Beirne's sphincter can be carefully studied. When the caliber of the gut is observed to be very small and further diminishes, or becomes closed as the instrument approaches the region of the muscle, and the mucosa is irritable, it is fairly safe to make a diagnosis of hypertrophy of O'Beirne's sphincter, especially if other characteristic symptoms are present.

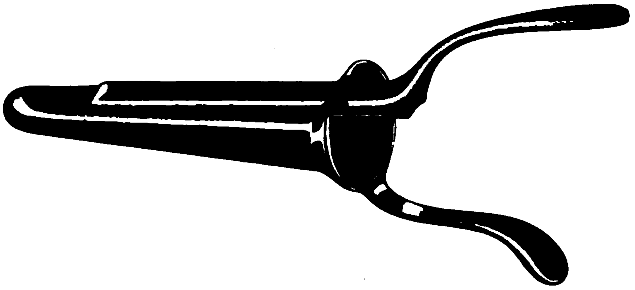

Fig. 94.—Brinkerhoff's speculum.

Hypertrophy of the rectal valves (Figs. 3, 9–11, 13) is not uncommon, but it is not so frequent a cause of constipation as some writers upon this subject would seem to believe. There are, however, undoubtedly cases of costiveness which result from the obstruction to the fecal current caused by the thickened valves. This type of constipation is invariably complicated by a chronic hypertrophic coloproctitis or other pathologic condition, which keeps the rectum in a constant state of irritation. The valves are easy to locate, but considerable experience and judgment are required to determine whether or not they offer sufficient resistance to the fecal current to be responsible for the delay and insufficiency of the stools. The lowermost valve on the left side and the middle valve, opposite the base of the bladder, can often be reached and examined with the finger if the patient will strain down gently.

The most satisfactory method in these cases, however, is to place the patient in the knee-chest posture, inflate the bowel, and examine it through the proctoscope. In this way one can quickly and with very little discomfort to the patient locate and determine the number of valves, their thickness, if they support fecal accumulations, and if the mucosa is normal. In order to determine the degree of obstruction caused by the valve it is well to adopt the suggestion of Martin; that is, to bend the end of a uterine sound, hook it over and draw the valve well down, then suddenly release it. If the valve returns to its position slowly it offers but slight if any obstruction to the fecal current; but if, on the other hand, it goes back with a snap, not unlike that of a rubber band, in all probability it acts as a barrier to the downward course of the feces and causes the stools to be delayed. Frequently patients suffering from chronic constipation go for a considerable time without having any desire to evacuate the bowel. In such cases if, upon examination, the lower rectum proves to be empty and fecal accumulations are detected, resting upon any of the valves, it is fairly safe to diagnose the cause of the obstipation as hypertrophy of the valves, especially if these appear to be thick and rigid. Sometimes the valves are situated one almost opposite the other (Figs. 9, 11), forming, as it were, a circular partition (Fig. 10), which materially lessens the caliber of the bowel at this point and interferes with the passage of the feces.

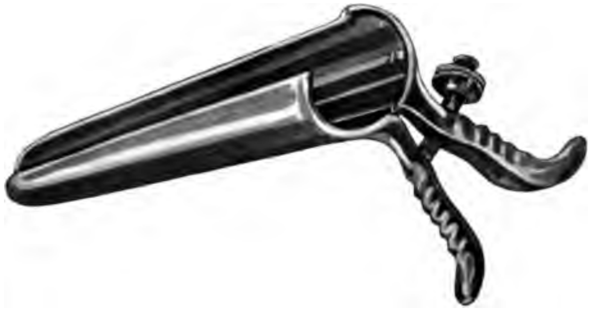

Fig. 95.—Hinged speculum.

Hypertrophy of the levatores ani muscles may result from chronic pelvic, uterine, vesical, or rectal disease, and induce constipation by contracting the sides of the rectum (Fig. 15) and prevent the feces from escaping. This variety of costiveness can be diagnosed by inserting the finger into the rectum and locating the thickened fork-like extensions of the muscles as they pass upward from the coccygeal attachments, along the sides of the rectum, toward the brim of the pelvis. While the finger is in the bowel, if the patient is requested to draw the anus upward, the rectum can be felt tightly contracting about 2 inches above the anus. Patients suffering from constipation consequent upon hypertrophy of these muscles usually say that they have a desire to stool, but just at the time when they think the feces are going to be expelled, the muscle contracts and prevents their escape.

Hypertrophy of the sphincter muscle may be the sole or a contributory cause of constipation and interfere with the stools for the reason that the muscle is in an irritable state and is excited to prolonged contraction by the approach of the feces. In this class of cases there is sometimes a prolonged contraction of the muscle, completely preventing the evacuation; at other times the spasms are brief and intermittent while defecation is going on, and the feces are discharged in short, flat, fragmentary pieces. Ordinarily it is not difficult to recognize this type of constipation, for the reason that upon inspection the anus appears tightly closed (Figs. 227, 230), and the muscle rigidly contracts when an attempt is made to introduce the finger. After the finger has been introduced it is tightly and continuously clasped by the sphincter in some instances, while in other cases the sphincter suddenly contracts and then relaxes. It is not only necessary to determine the degree of the hypertrophy of the sphincter and the part played by it in causing the constipation, but if one would hope to relieve the patient, it is equally essential that the fissure, blind fistula, ulceration, inflammation, fishbone, or other source of irritation, which excites the sphincter to frequent contractions, should be detected and removed.

Deviated Coccyx.—A deviated coccyx is usually marked by aching pains in the region of the sacrococcygeal joint, which are aggravated when the patient assumes the sitting posture. Except when the condition is congenital these sufferers give a history of a severe fall upon the buttocks or of the bone having been broken during childbirth. When the bone is tipped forward sufficiently to interfere with the evacuations the patient states that the excrement seems to be arrested by something which projects into the rectum just above the anus. One can easily determine if the coccyx is deviated and to what degree by inserting the index-finger into the rectum and seizing the bone between it and the thumb, and in the same manner it can be ascertained whether or not the upper is detached from the lower coccygeal segment.

DISEASES OF THE RECTUM AND ANUS

Fissure in ano is a frequent cause of constipation, both in adults and children. Painful ulcer or fissure is easily recognized by its location at the posterior anal commissure, its slit-like appearance (Fig. 239), sharply defined edges, great sensitiveness, and irritable condition of the adjoining skin. Other symptoms which point to this condition are tearing and burning pains during stool and reflected pains in the sacrococcygeal and vesical regions following defecation, and frequent contractions of the external sphincter.

A demonstration of fissure in ano can usually be made by everting the posterior edges of the anus and unfolding the edges of the inflamed skin tag which indicates its location. The speculum and digital examination should not be employed in these cases, because they cause great suffering and are unnecessary for the diagnosis.

Ulcers of the anorectal region can be differentiated from other affections by their numbers, irregular shape, and ragged edges. When situated at the anus, they cause considerable pain and sometimes spasm of the sphincter, but in the upper rectum they induce but little, if any, suffering. They can be quickly located by means of a digital, specular, or proctoscopic examination. A careful history should be obtained in these cases in order to determine whether the ulcers are due to injury, dysentery, tuberculosis, syphilis, cancer, chancroids, or gonorrheal infection, and in order to find out the part which such an etiologic factor may have played in bringing about the constipated state.

Hemorrhoids are of two kinds: *internal*, covered with mucosa; *external*, when they have a coating of skin. Both types of piles have been known to induce constipation, either through blocking of the anus by the tumors, by causing the patient to delay going to stool owing to the pain which they produce during and after defecation, or through the obstruction offered to the passage of the feces by sphincteric spasms, when the hemorrhoids are inflamed or irritable.

Internal hemorrhoids are segmented, dark-bluish, cone-shaped tumors which project from the mucosa on different sides of the bowel at the lower part of the anal canal. There are two varieties of *external* hemorrhoids: the *cutaneous*, or typical skin-tag, and the *thrombotic*, which presents at the mucocutaneous juncture as a firm sensitive purple-colored swelling, which keeps the sphincter in a constant state of irritation. Both forms of external piles favor constipation because they produce painful defecation and spasmodic contraction of the sphincter muscle.

Rectal polypi, when sufficiently large, may interfere with evacuation. They are differentiated from hemorrhoids by their length and pedunculated attachment, which enables one to pass the finger around them.

Prolapsus Recti.—This is a not uncommon cause of constipation, especially when the upper part of the rectum becomes invaginated into the lower and protrudes through the anus. The prolapsed bowel presents as a cone-shaped tumor, with its base attached to the entire circumference of the gut (Fig. 220). It is covered with normal mucosa and has a central slit. Internal hemorrhoids, polypi, and procidentia cause but little discomfort, except when they protrude and become strangulated by the sphincter muscle. In doubtful cases, without protrusion, the diagnosis can quickly be cleared up by means of digital, specular, or proctoscopic examination.

Stricture of the rectum invariably causes more or less constipation, and the degree of interference with the stools depends principally upon its location and the amount of obstruction induced by it; the costiveness being more markéd when the constriction is in the anal canal than when it is higher up. It is essential, in these cases, to determine the location of the occlusion, and to note whether the stricture is of the annular or tubular type, and to observe the extent of the ulceration above and below it. It is also necessary to obtain a complete history in order to ascertain if the constriction is the result of syphilis, tuberculosis, malignant disease, traumatism, colitis, dysentery, or foreign bodies. Strictures located at the anus cause a very much greater degree of suffering than those situated above the anal canal; and anal constrictions are most frequently due to surgical operations, syphilitic and tuberculous ulceration, epithelioma, and fissure, which excite the sphincter to frequent contraction and cause it to become hypertrophied. This form of stricture is easily diagnosed by everting the anal margins and noting the tightness or occlusion of the anus, or by introducing the finger into the bowel.

Stricture of the rectum proper is most frequently located from 1½ to 3 inches above the anus, though it may be found in any part of the rectum or sigmoid flexure. When in the lower rectum, a diagnosis is easily made because it can be located by the finger, and its situation and the amount of occlusion caused by it can be determined. By the examining finger one can also find out the extent to which the bowel is involved, with the amount of ulceration present, and accurately determine the nature of the occlusion, as well as its source—cicatricial tissue, enterospasm, tumors, foreign bodies, hypertrophy of the rectal valves, enlargement of the prostate, or extra-intestinal pressure.

Formerly much space was devoted in text-books to a description of *phantom* stricture, but in my opinion the phantom strictures formerly diagnosed, which were felt at one time and not at another, were, in reality, either rectal valves—which have a wide range of mobility—or else intermittent spasmodic contractions of the levator ani or sphincter muscles.

Until the advent of the proctoscope and sigmoidoscope, stenoses situated above the reach of the finger were permitted to go unrecognized; while now, with the aid of these instruments, they can be located with ease and accuracy and studied at short range.

Bougies are dangerous and should not be employed for diagnostic purposes in this class of cases, especially when the suspected stricture is above the peritoneal attachment of the rectum, on account of the associated ulceration, with risk of rupturing the bowel and setting up a septic peritonitis.

Benign tumors (**polyps**) of sufficient size to interfere with the fecal current are seldom encountered in the lower bowel. When present they can be readily diagnosed by inspection through the proctoscope or by encircling them with the finger.

Malignant neoplasms invariably cause more or less constipation. At first the interference is slight, and the patient by careful attention to diet is enabled to secure a daily stool; then cathartics must be added, and, still later, large doses of medicine and copious enemata are necessary to secure an action; by and by the strongest purgatives and very frequent copious irrigations are rendered imperative in order to keep the intestine free from fecal accumulations; finally, when the bowel becomes almost occluded, constipation alternates with diarrhea, or the frequent and fluid stools predominate because solid feces are unable to pass the constriction.

The frequency of obstipation due to malignant disease may be better understood when I state that 80 per cent. of all intestinal cancers are located in the rectum. Cancer of the colon is usually of the annular or ring-like type, while malignant disease of the rectum ordinarily manifests itself in the form of hard, large or small, nodular, infiltrating masses, which may or may not be ulcerated. Patients suffering from cancer of the lower bowel complain of weight, bearing-down pains, and an incessant desire to go to stool, unrelieved by a movement, frequent micturition, and pain in the back as well as along the limbs.

Cachexia is present and the stools frequently have a nauseating odor, may contain enormous quantities of jelly-like mucus when the growth is of the colloid variety; and of pigment in the melanotic type of carcinoma.

In addition to the symptoms already mentioned, persons having occlusion of the lower bowel caused by a well-developed stricture or malignant disease suffer from indigestion, tympanites, emaciation, colicky pains, burning sensations in the bowel, almost constant straining, discharge of mucus, pus, and blood, excoriation of the skin about the anus, relaxed sphincter, skin tags, and pruritus.

A diagnosis of malignant neoplasms situated in the upper rectum, sigmoid flexure, or at the anus can be made with a fair degree of certainty by noting if the inguinal or lumbar glands are enlarged and by ascertaining the age of the patient and the duration of his illness; but a diagnosis thus arrived at should be confirmed by determining the presence of cachexia, by making a digital and proctoscopic examination, in order to locate and observe the number and location of the tumors, and to ascertain their character (hard, soft, movable, or ulcerated). A section of the growth should be removed and examined with the microscope.

Fecal impaction in the rectum causes many manifestations similar to those induced by the presence of a cancer or other tumor of considerable size situated in the lower bowel. The patient complains of sensations of weight and fulness in the rectum, bearing-down pains, constant desire to go to stool; but is unable to discharge the feces when he endeavors to evacuate the bowel. Coprostasis, especially in cases where there is a very large mass or several smaller masses (Fig. 40), through pressure gives rise to catarrh of the bowel, pain over the sacrum and coccyx, frequent micturition, irritation of the urethra, prostate, uterus, and bladder, hemorrhoids from straining, and often fissure when the mass is finally expelled.

Patients suffering from chronic fecal impaction invariably develop spurious diarrhea sooner or later, and the fluid feces which are discharged through or around the valve-like mass have a fetid odor and keep the mucosa and skin about the anus in a constant state of irritation. Through injury of the levator ani and sphincter muscles, caused by the frequent and prolonged retention of the feces, these muscles are excited to spasmodic contraction, and in consequence they frequently become so hypertrophied as to induce constipation after the impaction has been relieved. Not infrequently, however, the sphincter muscle becomes paralyzed from the continuous irritation induced by the mass, and remains passive, permitting constant dribbling of liquid feces through the anus (Fig. 230). Patients suffering from recurrent coprostasis complain of the same systemic manifestations as those having chronic constipation from other causes; such as headache, dyspepsia, skin affections, nervous symptoms, insomnia, lassitude, etc.

Fecal accumulations which have been permitted to remain in the bowel for a considerable time and to become large and hard are frequently mistaken for cancer. This is especially apt to be the case when they are situated in the sigmoid flexure or upper rectum, causing this part of the gut to become invaginated into that immediately below it; for the reason that the mucosa is now placed between the examining finger and the fecal tumor. Swellings of this type are, however, distinguished from carcinoma by their doughy consistence, indentability, central location in the lumen of the bowel, the fact that they have no mucous covering—or if present, it can be made to slip backward and forward over the mass—mobility of the accumulation and characteristic odor, large size and quick formation of the swelling as compared with new growths. Fecal accumulation can be further differentiated from malignant disease by the absence of enlarged glands, cachexia, or rapid emaciation, and the lack of pus, blood, mucus, and fragments of tissue in the stools, so commonly found in the evacuations of cancer patients.

Fecal impaction should always be suspected when the patient has no evacuations or a spurious diarrhea for several days or weeks and complains at the same time of the manifestations mentioned above.

The diagnosis of coprostasis in the rectum in the majority of cases can be quickly and easily made, for the reason that the retained mass is readily located by means of digital examination, and its size, form, and consistence are easily determined; but when located in the upper rectum and lower sigmoid, it may be necessary to practise proctoscopic, vaginal, and bimanual examination, or, in very obscure cases, to make an exploratory incision in order to clear up the diagnosis.

Fecal impaction can be differentiated from gall-stone, enterolith, and pancreatic obstruction by the doughy feel and the large size of the tumor. When a tumor presents in the sigmoid or colon, causing dangerous symptoms of occlusion, and its nature is not apparent after getting the history and making a thorough examination by means of palpation and the colon-tube, the abdomen, intestine, or both should be opened without delay; then an accurate diagnosis can be made. For the differential diagnosis between carcinoma and coprostasis, see Diagnosis of Malignant Tumors. The rectum and vagina should be examined in all cases of constipation and obstipation to determine if it is the result of an impaction.

CHAPTER XIV

GENERAL REMARKS ON TREATMENT

THE inestimable number of therapeutic measures which have been suggested for the relief and cure of constipation are evidence of the fact that the successful treatment of this complaint is no light task, and that in order to cure chronic costiveness in its varying aspects the physician must possess great patience, ingenuity, exceptional diagnostic ability, and a most thorough medical training.

The community at large has been educated to believe that chronic constipation is of but slight importance and easy to overcome, so easy, in fact, that anyone can cure it; when, in reality, costiveness is one of the most obstinate and difficult affections as regards a permanent cure with which we are confronted.

A glance at the etiology and a study of the symptoms and consequences of constipation will suffice to convince the intelligent physician that the handling of this class of cases should not be left to the patient, his friends, the druggist, or the patent medicine vender, but that the best professional man obtainable should be entrusted with the treatment. It is a great mistake to minimize to the patient the difficulty of curing constipation; on the contrary, the sufferer should be informed that in order to be successful the treatment must necessarily extend over several weeks and sometimes months, and that he must make it his business to get well. There is no satisfaction in treating a patient troubled with chronic costiveness who will not place himself completely in the hands of his medical adviser and carry out his instructions to the letter, irrespective of the loss of time and bodily discomfort.

Personally, I do not accept patients who will not place themselves in my hands and submit to a regular course of treatment, covering a period lasting from six to eight and occasionally ten weeks. The patient can gain nothing from an occasional visit to the office for advice and treatment, in so far as a permanent cure is concerned; whereas a great deal can be accomplished with the *systematic* handling of persons suffering from constipation.

Dispensary statistics show a small percentage of real permanent cures in this class of patients. In the average clinic it is the custom to give to the patients a piece of paper with 23 or other number marked upon it, calling for a stereotyped cathartic or laxative formula, which will probably secure an evacuation, but have no lasting effect. Unfortunately, many a physician pursues the same plan with his private patients, with the additional privilege thrown in that they may see him write out the prescription. In both instances little if any time is devoted to the making of a careful diagnosis and to instructing the patient as to what he should eat and how he should live.

It is a deplorable fact that medicines are frequently selected with a view to please the patient by securing an immediate action, rather than for their curative properties. Constipated individuals should be divided into two groups: (*a*) Those seeking temporary relief and (*b*) persons who wish a permanent cure. For the *former*, purgatives, cathartics, laxatives, enemata, or glycerin suppositories, etc., may be prescribed from time to time to secure an immediate evacuation, but with the understanding that no permanent benefits are to be expected from them. For the *latter*, on the other hand, a systematic course of treatment should be mapped out, embracing the therapeutic measures hereafter to be described, or an operation advised, when it is indicated.

Purgatives frequently act as foreign substances within the intestine, excite peristalsis, increase mucous secretion, and cause an evacuation largely through the efforts of the bowel to eliminate the cause of irritation. The *primary* effect of cathartics in general, as well as of enemata, is to cause *abnormal stimulation* of the bowel, but their *secondary* effect is to induce a state of *depression* and *inactivity*, which persists for a much longer time than the stage of stimulation. When purgatives are administered frequently and continuously their stimulating effect gradually diminishes, while the sluggishness increases. This explains the reason why the system rapidly becomes accustomed to laxative remedies, making it necessary for constipated subjects either to increase the dose or to change to another drug, as occasion demands, in order to secure daily movements.

Many of the medicines used to secure an evacuation produce deleterious effects other than their irritant action upon the bowel, proving harmful locally as well as to parts far removed from the intestine.

In my experience the drugging of constipated patients has proved disagreeable and postively injurious in many instances, and has but rarely accomplished anything toward permanent relief.

Unfortunately the indiscriminate treatment of constipation by medicines is not confined to adults, but these agents are recklessly employed to move the babies' bowels, when the same end could be obtained as effectively by other and less harmful measures.

I never miss an opportunity to point out to my constipated clientèle the little good and the great amount of misery which will invariably follow the indiscriminate use of purgative household remedies, patent medicines, and other chemical agents having a purging effect upon the intestine. Nor, on the other hand, do I omit to call their attention to the great benefits which are to be derived from cold-water drinking, dieting, regular attention to the hygiene of the bowel, exercise, and other non-medicinal measures, which may be employed for the relief of constipation when instituted after the manner recommended elsewhere.

I do not hesitate to state that when systematically and properly treated the majority of people suffering from chronic constipation can be permanently cured without the aid of internal medication. Strong as it seems, this statement is based upon seventeen years experience in the clinic, hospital, and in private practice. Personally, I have not, with a very few exceptions, used medicines in the *curative* treatment of this affection in many years, and the results obtained from the *non-medicinal plan* have been vastly superior to those accomplished by *drugs* in the earlier years of practice.

My first contribution upon the treatment of constipation was read at the Kansas City Academy of Medicine in January, 1891. My next paper was published in the March issue of the *Medical Herald*, 1893. Since then I have published several articles upon this topic. In recent years I have obtained a degree of success in the treatment of constipation without drugs which in former years I deemed utterly impossible. I do not contend that constipation cannot be cured by means of medicines properly selected, but I do claim that purgatives, cathartics, and laxatives are too often and too indiscriminately prescribed when the same or better results could be accomplished by the employment of some of the more simple and less harmful therapeutic agents at our disposal. Neither do I wish to convey the impression that I do not employ laxative remedies at all, for such is not the case. While it is true that I do not use them to *cure* constipation, I frequently resort to them at the request of the patient in order to secure a movement quickly, to soften the feces, or to relieve the bowel and prevent pain following abdominal and rectal operations. I also use them to secure the necessary evacuations in patients suffering from certain acute affections—paralysis, chronic invalidism, or in case of the very aged or the insane—for whom it is neither convenient nor advisable to prescribe a long course of treatment with the object of obtaining a permanent cure.

In order to keep pace with the progress made in mechano-physio-hydro-therapeutics and in the surgery of the intestine, many changes have been made since I originally outlined my plan of treating constipation without the aid of drugs. This accounts for the discrepancies between my former and recent writings upon this subject. Some of the features of the treatment recommended by me are new, but the majority of them are old and have been suggested by others, but heretofore they have not been properly combined or accorded the prominence which they deserve. For the benefit of those of my readers who are advocates of the treatment of constipation by medicine, and for those who employ drugs on account of lack of familiarity with the various non-medicinal measures employed to relieve and cure this complaint, I have devoted two chapters in this volume exclusively to the medical treatment of constipation.

I wish once again to emphasize the necessity of a careful diagnosis in order to detect *all* of the etiologic factors entering into the case; for in this way only can the physician determine if the patient needs local or general treatment, or both.

Equipment.—In order to carry the treatment of the manifold types of constipation to a successful issue it becomes necessary, in the first place, to improve upon the armamentarium of so many physicians—a pencil, a prescription pad, and a fountain syringe.

The deplorable habit of drugging constipated subjects until medicines fail to work and then substituting copious enemata—a most pernicious practice—is fortunately becoming more and more a thing of the past. The progressive physician, who handles a large number of these cases, must be the possessor of a roomy well-appointed office, with a toilet in or near it. Besides speculums, proctoscopes, sigmoidoscopes, bougies, and other instruments for examining purposes, his office equipment should comprise a complete electric outfit, massage-rollers and balls, vibrators, suction-pump, therapeutic lamp, and irrigators, to aid him in the treatment after a diagnosis of the case has been made.

A large percentage of individuals suffering from chronic constipation can be cured by following the instructions of their medical adviser in regard to what they should eat and how they should live, and by reporting to him at the office regularly two or three times weekly in order to receive such physical or other treatment as their case may require.

Now and then, however, obstinate cases are encountered, where, in addition to constipation, the patient suffers from headache, insomnia, neurasthenia, anemia, loss of weight, and other manifestations of chronic intestinal auto-intoxication. In order to do full justice to this class of patients it is essential that the physician in charge should possess or have access to a sanitarium thoroughly equipped for giving baths and douches, massage, electricity, vibration, and intestinal lavage, where the patient can obtain the necessary diet and benefit of a rest cure. Many Americans who suffer from constipation and other complaints are frequently cured while abroad because they have great faith in the ability of some celebrated physician of whom they have heard; consequently, at his suggestion they enter a hydrotherapeutic or other well-equipped institution, where they remain and take a systematic course of treatment with very beneficial results. The same benefit could have been obtained at home under equally favorable circumstances, which emphasizes the value of *institutional* treatment in certain cases.

A complete equipment not only enables the physician to select the necessary therapeutic procedures indicated in the various cases, but also makes a favorable impression upon the patient.

In order to refresh the memory and make it easier for the reader to comprehend the objects for which the various therapeutic measures about to be suggested for the relief and cure of constipation are designed, I will briefly enumerate the principal causes of the different types of constipation and obstipation—viz., heredity, sex, age, occupation and environment, upright position, too little outdoor exercise, dissipation, irregular hours for evacuating the bowel, inconvenient and improperly constructed water-closets, drug and enema habits, chronic invalidism, psychic influences, errors in diet, and the following mechanical causes: congenital deformities, extra-intestinal pressure, stricture, tumors, foreign bodies, fecal impaction, adhesions, angulations, abnormal mesentery, volvulus, diverticula, hernia, invagination (intussusception), enteroptosis, dilatation of the intestine, enterospasm, hypertrophy of O'Beirne's sphincter, rectal valves, levator ani, and sphincter muscles, and diseases of the rectum and anus, such as ulceration, fissure, and hemorrhoids.

CHAPTER XV

EDUCATIONAL AND PROPHYLACTIC TREATMENT

CONSTIPATION may be inherited, but in the vast majority of cases it is acquired, and in most instances the habit is formed during infancy and childhood.

The cause of the trouble, in many cases, can be traced to mismanagement on the part of the mother in controlling the diet and attending to the bowel hygiene of the infant. Unfortunately, many children are permitted to eat whenever they please and to make a meal principally on the food they choose, which often is composed of too much meat, and they are left to attend to the calls of Nature whenever they like or think to do so. Such a manner of living for the young predestines them to the evils of constipation, indigestion, and other gastro-intestinal ailments. These dire results can be easily avoided by teaching children to form good habits, with regular hours for eating, sleeping, and moving the bowel, and by studying and changing their diet in such a way as will tend to favor more complete and regular evacuations.

Children and, for that matter, adults should be taught the importance of going to the closet and emptying the bowel as soon as the desire to stool is manifest, because when this warning of Nature is repeatedly ignored the bowel loses its sensibility, constipation ensues, and the feces may collect in the rectum in considerable quantities without producing any sensation whatever.

Young women, especially in this country, while in restaurants, theaters, or other public places frequently fail to go to the toilet when they have an urgent desire to do so through false modesty, because they wish to avoid being seen to enter the water-closet or privy. This unhygienic practice should be discouraged by their parents or guardians.

Our school systems, both public and private, are responsible for the formation of the constipated habit in a great many cases, due to the fact that the children are kept too long and too steadily occupied, are not excused when they should be, and especially because the toilet facilities are insufficient, improperly ventilated, unclean, uncomfortable, or so publicly situated that the children defer going to the closet as long as possible.

Principals and teachers of boarding-schools and colleges should be educated up to the fact that the poor memory, lassitude, inaptitude, and headaches so frequently encountered among their pupils are due, in no small proportion of the cases, to constipation and fecal retention, and that it behooves them to adopt some plan so that regular visits are paid to the closet. I know a principal who keeps a book and requires her girls to register when they go to the toilet; they are divided into classes, so that they can have practically the same time each day for attending to the hygiene of the bowel. When they have failed to have a movement or when it has been unsatisfactory, they must report to the principal, who either advises them what to do or places them in the hands of a physician.

In many of our city and state hospitals, penitentiaries, jails, almshouses, insane asylums, and other public and private institutions the number of water-closets should be increased tenfold in order to accommodate their inmates and avoid the necessity of waiting a long time before they can gain entrance to the toilet, because such delay invariably leads up to and aggravates the constipated habit. It is also important that the superintendents or their assistants keep some sort of supervision over the unfortunates under their care, and see to it that they have a daily evacuation. Laborers, clerks, and others, who must work from early morn until late at night and are not permitted to take time off during the day, should be taught the value of cultivating the habit of evacuating the bowel immediately following the morning meal; first, for the reason that this is the most natural time, because the food stimulates peristalsis, which is followed by the desire to stool; second, to avoid the consequences which would follow the carrying about all day of the accumulated feces.

Individuals who suffer from stricture, hemorrhoids, or other painful affections will save much discomfort by endeavoring to bring about an action both morning and night, because then the movements will be smaller and softer and cause much less pain than would follow one large, hard evacuation.

Many of the privies and water-closets belonging to private families are not only poorly situated and ventilated, which discourages their frequent use, but they are uncomfortable and their seats are too high in relation to the floor. When compelled to sit upright and with the feet dangling, one loses much of the benefit derived from the contraction of the abdominal muscles, as well as the pressure of the thighs against the lower abdomen, factors important to the act of defecation; because of these reasons a foot-stool should be placed in every toilet utilized by children.

Physicians in their work and medical bodies in session should do everything in their power to educate the laity and to point out to them the slight benefit and great amount of harm which come from the indiscriminate use of purgatives, patent medicines, and household remedies, as well as the custom of injecting enormous quantities of hot water in order to bring about the much desired daily movement. It should be made clear to them that such procedures simply serve to clear the bowel temporarily, but do nothing whatever to cure the original complaint, and that the persistent use of cathartics produces indigestion, catarrh, and other far-reaching effects. The frequent distention of the bowel with water will in time cause dilatation, displacement, and paresis of the bowel, conditions *well-nigh incurable.*

Persons who have already contracted the drug habit for relieving the bowel should be advised to use purgatives as rarely as possible and in small and decreasing doses, better still, to substitute in their place such tonic laxatives as cascara or one of the vegetable pill combinations (see Formulary), which will secure the desired movement and at the same time help toward a permanent recovery.

It should be made plain to this class of sufferers that the daily taking of mineral waters, purgatives, and enemata, while it empties the bowel, possesses no curative action whatever, and that if they desire permanent recovery from their constipated state, it is necessary to discard this plan for medical, physical, and surgical measures, which will do less harm and at the same time effect a complete cure.

The public at large, and our costive clientèle in particular, should be made aware of the many reliable therapeutic procedures at our disposal, which when properly employed, effectively prevent and cure constipation. Prominent among such remedial agents are dieting, water drinking, small cold enemata, baths, douches, exercise in the open air, bodily movements, massage, mechanical vibration, electricity, psychotherapy, and, under some circumstances, surgical operations, which, when employed either alone or in combined treatment, are sufficient, as a rule, to overcome the most obstinate cases of chronic constipation.

In concluding my remarks on the educational and prophylactic treatment of constipation, I wish to state that my experience with the prevention and treatment of this complaint, by the measures herein suggested, has proved so extremely satisfactory that I can commend them most heartily to all physicians called upon to treat this troublesome affection.

CHAPTER XVI

PSYCHIC (MORAL) TREATMENT

In the chapter devoted to the Etiology of Constipation I have already shown how digestion may be impaired and the act of defecation delayed or prevented through the influence of the mind upon the gastro-intestinal mechanism when disturbed by anger, fright, sorrow, worry, or depression; and also how the act of defecation may be facilitated by concentration of the mind upon this one object, or delayed when it is diverted by reading or in other ways while in the toilet. In exceptional cases sufferers from constipation become so very anxious to have an evacuation that the anxiety, through its influence upon the nerve-centers, produces an inhibitory action upon the motor mechanism of the bowel, and in this way delays or prevents a movement. Such patients should be advised to occupy and divert their mind in some way as the hour for defecation approaches, and to attempt evacuating the bowel at the very first manifestation of the desire.

I have also called attention to the fact that digestion is more thorough and constipation less frequent in contented persons placed amid pleasant surroundings than where the opposite conditions prevail. From what has been stated, it may be correctly inferred that it is a wise plan when outlining the treatment of constipation to determine both the mental and the bodily drawbacks which play their respective parts in causing irregular or insufficient evacuations.

Nearly all constipated subjects at one time or another suffer from indigestion, insomnia, nervousness, irritability, and disinclination for social and business engagements, due in many instances to the disturbed mental condition brought about through worry and concentration of the mind upon their complaint.

Individuals suffering from aggravated constipation have a well-grounded reason for worry, but not so others who suffer from *pseudo-costiveness*, that is to say, they believe that they are suffering from constipation and are being continually poisoned by retained feces because they do not have more than one action a day, or the stools are abnormal in shape or insufficient in amount. It is, therefore, of the utmost importance to alleviate the mental distress and to correct the erroneous impression as far as feasible. The mental attitude can be straightened out in most instances by *suggestion*, *encouragement*, and by keeping the patient occupied, in the midst of amiable people and pleasant surroundings.

In the psychotherapeutic treatment of persons suffering from costiveness it is of the utmost importance that each case be studied individually in order to determine if the patient is amenable to psychotherapy, because some subjects respond promptly, others but slightly, and still others, not at all, to suggestion. A patient should never be forewarned that an attempt is contemplated to relieve or cure him through suggestion, but, on the contrary, he should be informed that certain definite results are to be expected from the plan of treatment (which may include massage, mechanical vibration, electricity, etc.) about to be instituted. Psychotherapy is too often adopted as a last resort, for when practised in combination with other therapeutic measures much better results are obtained by suggestion than when it is given a trial after other remedies have failed. Some authorities believe in the administration of certain quieting drugs, especially to their nervous clientèle, in order to place them in a receptive mood for suggestions, but this is bad practice, because no more can be accomplished in so far as the benefit derived from psychotherapy is concerned, and, further, because there is the undesirable effect of the drug to be reckoned with on the succeeding day. Suggestion can be conveyed to these patients while they are in the hypnotic sleep (which is rarely justifiable) or while in the conscious state either directly or through inference. Patients suffering from constipation and other complaints have not only been cured in this way, but also by worshiping and praying to idols, religious relics, the Holy Virgin of Lourdes, by wearing chains, kissing precious stones, or by carrying amulets about with them which have a reputation for healing certain ailments.

Success in the treatment of disease by psychotherapy is based on *faith*, that is, the subject must have absolute confidence in his physician and believe implicitly in his ability to cure him; on the other hand, he must have faith founded upon what he has seen, read, or learned of what will happen in his behalf in case he makes supplication to some saint, touches a holy relic, or carries a lucky or healing object.

Suggestion for good or evil may be conveyed to the patient verbally—by a look, a gesture, or in other indirect ways.

The physician who possesses a pleasing personality, magnetic power, a cheerful disposition, and a business-like air often succeeds, for the reason that he inspires faith in his patients and gives them encouragement and hope; while, on the contrary, the doctor who is cross, crabbed, and sour faced, does not cure because he fails to inspire any confidence in the patient, who is left sadly discouraged and depressed through inferring that his condition is serious if not incurable. Wonders have been accomplished in the treatment of constipation by encouraging words, congratulating the patient from day to day upon his improved looks, and by suggesting that if he will do this and that improvement will be still more rapid.

The patient should be told that if he will enter the toilet at an *exact* time (neither before nor after) and concentrate his mind upon the act of defecation, that in all likelihood a copious movement will follow. It should be pointed out to him that most people who make up their minds to wake up at a *certain* hour to catch a train, succeed in doing so, and that if he will continually impress upon his mind that he must have an evacuation at a given hour, the desired result will in all probability be forthcoming.

I have on many occasions administered colored water, bread pills, or other non-laxative agents to patients suffering from constipation, at the same time conveying to them the idea that these were reliable cathartics which would bring about an evacuation the next morning; many times my prophecy came true. Often I have administered to patients who had not had a movement in twenty-four hours a very light electric, mechanical, vibratory, or massage treatment, which could not possibly excite peristaltic action, and have coupled this with the suggestion that if they would immediately rise from the table and go to the toilet before the effects of the application wore off, they would have an evacuation, and not infrequently they were successful. The influence of the mind upon the act of defecation following suggestion has been rendered apparent in other ways also; for instance, I have treated individuals suffering from fissure or some other painful affection of the anus, who regularly had one large, well-formed movement daily, the passage of which, however, was a source of much suffering; in order to secure smaller and softer evacuations and to minimize the pain consequent upon defecation, I have suggested that they persistently go to the closet day after day immediately after the morning and evening meals, and concentrate their mind on the effort to secure an evacuation. Some have failed to obtain the desired result, while others have succeeded after a time in having two evacuations daily instead of one as formerly, though in the beginning the stools were incomplete, but they became more satisfactory as the new habit of having two movements daily instead of one became established.

There is sufficient evidence in medical literature to warrant the assertion that under certain circumstances suggestion through the mind can be made to influence the *sensory*, *motor*, *vasomotor*, and *trophic nerves*, thereby modifying sensation, stimulating muscular contraction, improving nutrition, and increasing secretion. If this is true, then suggestion is a powerful weapon, indeed, when properly employed, with which to combat constipation and other diseases.

In the treatment of constipation I have frequent recourse to psychotherapy, but rarely use it to the exclusion of the therapeutic measures elsewhere described, for the reason that in my experience quicker and better results are usually accomplished by combining suggestion with other forms of treatment. One who has not repeatedly employed psychotherapy in the treatment of this class of affections is unable to form a correct estimate of its great value.

In obtaining the history of persons suffering from constipation, be it imaginary or real, it is advisable to listen patiently to their story, for in this way much information is gained as to the extent of the mental factor in the case. It is never good policy to belittle the symptoms of these sufferers or to tell them that they are not really sick, but think they are, for the reason that from their standpoint they know they are constipated, consequently they at once lose confidence in the doctor who tells them they are not. On the contrary, they should be humored in their belief, but informed that their case is curable if they will have confidence, exert their will power to help overcome the constipated state, and carry out to the letter all instructions given them. If the patient has an exaggerated idea of the curative powers of electricity, mechanical vibration, massage, or water drinking, give it to him and permit him to believe that it will benefit him greatly, but at the same time combine this with other therapeutic measures which are more effective while not so important in the eyes of the patient.

Moral suasion, in the management of constipation, should be supplemented by instructions to the patient to keep regular hours, abstain from dissipation, and spend a considerable part of his time in the open air, walking, playing golf, or horseback-riding, in order that the musculature of the abdomen and intestine be sufficiently exercised, the circulation improved by the consumption of a greater amount of oxygen, and the nerves soothed through the effect of pleasant surroundings and the relaxation incident upon the removal of business worries, all these conditions tending to favor more regular evacuations, and to correct the nervous and other manifestations which are such faithful concomitants of the constipated habit.

CHAPTER XVII

DIETETIC TREATMENT

THE very great benefits to be derived from the dietetic treatment of *atonic*, *spastic*, and *mechanical* constipation have been grossly underestimated.

In handling this class of cases it is necessary for the physician to familiarize himself with the cause of the trouble and the peculiarities of the patient before attempting to regulate his food. In this way only can he determine which foods to prohibit and which to prescribe in order to stimulate peristalsis and to increase the intestinal secretions.

A large percentage of cures of persons suffering from *atonic* and *spastic* costiveness can be effected by having them correct errors in their diet and follow the general rules of health. But whereas in *mechanical* constipation diet accomplishes nothing so far as the cure is concerned, it does a great deal toward softening the feces, so that the obstruction is more readily passed.

Because of the many etiologic factors entering into the causation of constipation under varying circumstances, it is impossible to devise a diet which would give satisfaction in all cases. In selecting foods, it is necessary to take into consideration other affections which may complicate the situation, and to change the diet *gradually* in order to avoid attacks of indigestion, diarrhea, and colic, which frequently follow a rapid change from a liberal to an exclusively vegetable diet. To accomplish the best results the various articles of food should be well balanced, and the diet-list of persons suffering from atonic and spastic constipation should contain in weight about six and a half times as much vegetable matter as it does of meat, together with a liberal proportion of starches, sugars, oleaginous foods, and water.

My experience is not in harmony with that of certain authorities, who believe that starches are universally detrimental to persons suffering from costiveness and many other gastro-intestinal ailments.

Were it not for its tendency to produce flatulence and dilatation of the stomach and intestine when long continued, in persons not accustomed to it, a *vegetable* diet would be ideal for constipated subjects. Because of these disturbances which may follow an exclusively vegetable diet, it is advisable in most cases to order a diet which contains a small proportion of eggs, meat, and other easily digested foods, some fat, a liberal amount of fluid (water), fruit, and a preponderance of vegetables rich in cellulose. Such a diet tends in many ways to influence the frequency of the stools. It leaves a bountiful residue, excites glandular secretion, favors the formation of acids, gases, fermentation, and the growth of certain bacteria, all of which promote peristalsis. Fruit produces a laxative effect upon the bowel through the action of the malic, tartaric, butyric, and citric acids it contains. The oily constituents derived from butter, cream, bone-marrow, bacon, and other foods containing fat serve to oil up the intestinal tract so that the feces can be propelled with greater ease and rapidity through the colon and into and out of the rectum. Lastly, the water increases the fluidity of the feces and prevents them from becoming dry and impacted, and when taken cold exerts a decidedly stimulating and tonic action upon the muscular and glandular mechanism of the bowel.

First, I will give a list of foods from which a diet suitable for all constipated individuals may be selected, and will then point out the articles of diet which should be forbidden.

FOODS PERMITTED

Cereals: Oatmeal, cornmeal mush, cracked wheat, hominy, gritz, and cream of wheat.

Soups: Bouillon, chicken, clam, oyster, beef (thin), mutton, vegetable, potato, barley, tapioca, vermicelli, and rice.

Fish: Oysters in any style except fried; broiled, baked, or boiled bluefish, rock, bass, trout, mackerel, and roe.

Meats: Bacon, broiled steak, mutton or lamb chops, boiled or roast beef or mutton, scraped or chopped beef, broiled sweetbreads, broiled or roasted chicken, turkey or squabs, and most small birds.

Breads: Brown, Graham, whole wheat, cornmeal, bran, and rye.

Oleaginous foods: Cream, bone-marrow, solid oils, and butter.

Vegetables: Carrots, turnips, boiled Spanish onions, beets, cauliflower, spinach, cress, celery, peas, string beans, corn, tomatoes, cabbage, Irish potatoes, squash, and sauerkraut.

Salads: Lettuce, cucumbers, tomato, asparagus, and grapefruit (abundant oil in all dressings).

Desserts and sweets: Sugar, limited amount of candy, honey, syrup, molasses, jellies, jams, marmalade, rice, tapioca, bread, apple, and fig puddings; baked apples, custards, ice-cream, junket, blanc mange (floating island).

Fruits: Lemons, apples, oranges, peaches, grapes, figs, prunes, strawberries, cherries, gooseberries, currants, plums, pears, and melons.

Drinks: Water (plain and aërated), milk (same), buttermilk, koumiss, zoolak, matzoon, malted milk, junket, weak tea, coffee (occasionally), grape and other fruit juices; cider, sweet wines, Sauterne, Tokay, Moselle, and in some instances a limited amount of beer or bitter ale.

Laxative Foods.—Of the various articles of diet given in the list known to produce a laxative effect, the following are the most reliable when properly prepared and consumed in judicious amounts—viz.: Water, porridge, cornmeal mush, cracked wheat, syrup, honey, molasses, sugar of milk, whey, buttermilk, coffee (for some people), apples, peaches, pears, prunes, cherries, figs, dates, raisins, preserved or stewed fruits, butter, bacon, and salad oils.

The above-named laxatives help to regulate the stools through the action of the organic acids, mineral salts, sugar, and fats they contain, which soften the feces, lubricate the bowel, and stimulate peristalsis.

The beneficial effect of *water* is generally recognized. I will not at present discuss water drinking in the treatment of constipation, for the reason that its merits are fully given in the chapter devoted to Internal Hydrotherapy.

In order to obtain the best results in the dietetic treatment of constipation the food should be changed as often as required, well masticated, and taken at regular hours, amid pleasant surroundings.

Arbitrary *time schedules* and *food tables* are impracticable in the treatment of constipation, hence they will not be given. I will, however, append the following dietary, which I have frequently found useful in the treatment of atonic constipation:

On arising: Drink one or two glasses of hot or cold water.

Breakfast: Raw fruit, oatmeal or cracked wheat, with plenty of cream, bacon, toast or brown bread and butter, honey or syrup, milk or coffee.

Lunch: Graham or corn-bread, butter, fresh fish, cold roast beef, mutton, or chicken; creamed or baked potatoes, asparagus, peas, carrots, well-oiled salad, jelly, stewed apples, peaches, pears, cider, small beer, buttermilk, junket, or weak tea.

Dinner: Oysters, bouillon, chicken or vegetable soup, boiled or broiled fresh trout, bluefish or mackerel; broiled steak, mutton, or lamb chops, hot roast beef, chicken, turkey, squab, creamed potatoes, string beans, spinach, cauliflower, celery, lettuce, cucumber, tomato, asparagus, or bean salad; ice-cream, bread, tapioca, fig pudding; custards, fruits, such as peaches, pears, apples, grapes, gooseberries, strawberries; bread and butter; cider, white wine, aërated water, and fruit juices.

On retiring: Figs, dates, prunes, a glass of water.

FOODS PROHIBITED

Excess of meats, especially liver and pork, salted, potted, preserved, or smoked fish and meats of all kinds, abundance of eggs, boiled milk, carbohydrates, barley, rice, wheaten flour, farina, gruels, macaroni, or other foods containing little water, canned beef or mutton, thick broths, tea, cheese, nuts, huckleberries, cocoa, chocolate, fruits, wines containing tannic acid, and alcoholic beverages.

As soon as it is observed that certain articles of diet do not agree with the patient, others should be selected which meet the indications and cause less disturbance. Frequently it will be found that foods which caused discomfort in the beginning of the treatment can be easily digested a little later, hence it is necessary to experiment until a suitable diet is found. In the presence of valvular disease concentrated foods are preferable to bulky articles, because the latter induce flatulence, which impedes the cardiac action. Coarse foods are also contraindicated in phthisis, because they irritate the intestine and are likely to start up a persistent diarrhea. In certain kidney affections whey should be substituted for water, for the reason that the latter in liberal amounts increases the pressure and danger of hemorrhage. The diet must likewise be greatly modified and certain indications met in constipated persons who also suffer from gastric and intestinal catarrh or ulcer, atony or dilatation of the stomach or intestine, diabetes mellitus, gout, and rheumatism, in order to avoid the discomforts which might otherwise arise in shape of flatulence, nausea, vomiting, palpitation, pain, and other manifestations.

In constipation complicated by *membranous colitis,* Von Noorden (*Diseases, Metabolism, and Nutrition,* 1903) strongly advises a bountiful and *coarse* instead of the frequently employed concentrated diet. A large experience in the treatment of this class of cases has convinced me that this plan is the correct one. Von Noorden maintains that costiveness can be relieved by the above diet and, further, that anything which brings about the disappearance of the constipation will also cause the disappearance of the colica mucosa. I have been enabled by means of heavy diet permanently to relieve nearly all my constipated clientèle who have suffered from this complication. In a very few instances I have witnessed a simultaneous return of both the constipation and membranous colitis, and on one or two occasions have observed the colica mucosa recur without the patient's again becoming constipated. Costiveness associated with this complaint is of the spastic type, and this class of sufferers can be saved much discomfort when the dietary is supplemented by hot fomentations over the abdomen to relieve the attack of enterospasm.

The evacuations are invariably larger and more frequent when the food is not *completely* masticated, and when the subject adheres to a strictly vegetarian diet than they are when the reverse obtains. In this connection it might be well to observe that persons suffering from the different types of constipation do not always require a radical change in the diet. In many cases it is not necessary to do more than to add or deduct one or two articles of the bill of fare. Especially is this the case when the patient is advised to take a glass of water in the morning and to lead a regular and active life. The most important thing in the dietetic treatment of constipation is closely to study the patient, in order to note his idiosyncrasies and the progress made in the treatment, so that changes may be made from time to time as occasion demands.

In some instances the time required to regulate the stools may be materially shortened by adding hydrotherapy, electricity, vibration, or massage to the cure.

Patients should be told in the beginning of the treatment not to become discouraged because regular evacuations do not follow immediately after the diet has been changed. They must be informed that the improvement in bowel activity will be gradual, and that the regulation of the movements must not be expected to manifest itself before the end of several weeks.

Indigestible substances, like agar-agar, wood shavings, cork, liquefied cellulose, hulled linseed, white mustard, and other seeds, beads, pebbles, and sand, have been prescribed in 1- to 2-dram doses in order to increase the amount of indigestible residue in cases of overdigestion, to excite peristalsis where the intestinal musculature is sluggish, and to increase the fluidity of the stools when they are deficient in water.

There is no question that these remedies will frequently excite more copious and frequent stools, but in many instances the benefits derived in this way are offset by the gastro-intestinal disturbances which follow in their wake. Of the above-named agents, agar-agar (see Regulin) gives the best results, because it adds to the bulk of the intestinal contents and stimulates peristalsis, and further, because through its affinity for fluids it serves to soften the feces and permits them to glide through the bowel with greater ease.

CHAPTER XVIII

EXERCISE AND BODILY MOVEMENTS

If there is anything that writers on constipation are agreed upon, it is the fact that frequency of stools may be increased by exercise.

There are many different varieties of *indoor* and *outdoor* exercises and sports which can be prescribed to advantage in the treatment of chronic or atonic constipation. To the *former* class belong calisthenics, fencing, boxing, wrestling, bowling, gymnastics, and basket-ball, and to the *latter*, walking, golf, horseback-riding, driving, rowing, swimming, bicycling, and games like tennis, cricket, and baseball. The above-named exercises are all useful in the handling of constipated individuals, but those which bring out a spirit of competition and which can be practised in the open air will be found most beneficial, because mind and body here work in harmony.

Exercise is not only useful in stimulating the bowel to greater activity, but is also of great assistance in strengthening a weakened constitution. To obtain the best results it should be carefully *balanced*, in order that one part of the body may not be developed at the expense of another. Several short brisk periods of mild exercise which divert the attention of the patient are very much more effective than those which are over-strenuous, last for a considerable time, or necessitate long-continued concentration of the mind.

In prescribing exercise, it is well to bear in mind the fact that some persons can take a greater amount than others. The beginner should never be overworked, and when it is found that he feels fatigued, depressed, sore and stiff from his exercise, it should be modified or discontinued altogether.

Exercise is largely a matter of habit, and practically every one can find time sufficient for this purpose if they will only put their will power to the test and endeavor to do so. In the beginning, as a rule, it is distasteful, but after a time most persons look forward with pleasure to their *constitutional*, a ride in the park, a swim, or their game of golf. When possible, the exercise should be taken amid pleasant surroundings in the open air, preferably in the country; but when this is impossible, it may be done in the gymnasium or living room, with the windows raised to admit the air and sunshine.

Meals should not be indulged in immediately after a long walk, nor should one take part in any form of active exercise sooner than one hour after eating.

Exercise in moderation and under proper circumstances is necessary to a healthy mental and physical existence; on the contrary, it is positively harmful to mind and body when prolonged and violent, as is the case in competitive sports, such as rowing, short- and long-distance running, and many other of the track and field games and sports.

It is absolutely essential that persons who follow a sedentary occupation should exercise before or after business hours. Owing to the variability of the constitutions and occupations of different individuals, it is impracticable to attempt to formulate a *routine* method of exercise, adapted alike to the needs of all sufferers from chronic constipation, but exercise, like medicine, should be prescribed with a definite object in view, in order to meet the exigencies of a given situation. To illustrate, one would be justified in prescribing horseback-riding for a lawyer or a banker having constipation, but it would be ridiculous to suggest the same form of exercise for a cowboy troubled with costiveness, or to advise a plowman to take a five-mile constitutional after he had finished his day's work.

Walking is the most popular form of exercise, because it is the cheapest, the easiest to carry out, and the most effective by exercising the different muscles of the body in a harmonious way. The good results in the treatment of constipation to be obtained from this form of exercise are generally recognized by both the profession and the laity. There is nothing which will do more toward augmenting the circulation, stimulating the appetite, improving the digestion, exhilarating the spirits, stimulating the emunctories, and exciting the intestine and other organs to a greater activity than a brisk walk through the park or over the hills. Walking not only encourages the bowel to act more regularly and effectively, but also sweeps the cobwebs from the mind, makes the world seem brighter, and gives a more cheerful outlook upon the future.

In order to obtain the best results, long walks should be occasionally interrupted by short periods of rest. **Running,** when done slowly and for short distances, may occasionally be recommended in this class of cases, but fast and long-distance running should be condemned because it induces undue fatigue and causes embarrassment to the heart.

Golf is fast becoming one of the most popular of the outdoor sports, and deservedly so, for it is entertaining, diverts the mind from business and other cares, enhances the circulation, exercises nearly all parts of the body, and can be enjoyed equally both by the old and young. In addition to the benefits derived from the walking, the bending and rotating of the body incident to the play, it strengthens the abdominal muscles and powerfully stimulates the liver and intestine to more vigorous action. Golf also produces a sensation of buoyancy in the player as a result of increased oxygenation of the body, due to the deeper respirations and the greater intake of oxygen.

Regular horseback-riding and **driving** over rough roads, through the shaking of the body, tends to strengthen the contractile power of the abdominal muscles, excite the flow of bile, increase peristalsis, and enhance the amount of mucus secreted—all of which aid essentially in overcoming the constipated state.

Rowing in competitive college boat-races is too violent for hygienic exercise, and is not to be recommended under any circumstances, but rowing for pastime frequently assists very effectively in overcoming constipation. Rowing of this kind greatly strengthens the muscles, favors the absorption of abdominal fat, makes the atonic bowel contract with greater vigor and propels the feces more rapidly downward, while the mucous glands are stimulated to more energetic secretion, to lubricate the bowel and soften the feces.

Swimming in moderation is conducive to more regular evacuations because of the exercise which accompanies it, and further, because the cool water, through its thermic and mechanical effect upon the circulation, acts as a general tonic for the body and directly stimulates the intestinal musculature and glands to functionate normally. Swimming in the sea is more refreshing and stimulating exercise than in fresh water.

Tennis, cricket, baseball, and **football** are serviceable in some instances in improving the condition of constipated patients, but will be found too strenuous exercise for the average case.

Calisthenics in *moderation* materially assist in developing the muscles and strengthening and stimulating the various organs of the body. Calisthenics *overdone*, or where the movements are complicated and the exercise prolonged, are positively harmful to children with a nervous and weakened constitution, because they produce mental and physical fatigue, owing to the necessary concentration of the mind upon the movements and the amount of work required.

Gymnastics, such as dumb-bells, Indian clubs, pulley-weights, medicine-balls, and exercises of this class, are useful in developing all or special parts of the body. It is a noted fact that persons who work in the fields or those who indulge regularly in either outdoor or indoor exercise suffer less frequently from constipation than do those who, through indifference, fail to take the necessary bodily exercise.

Boxing, wrestling, and **fencing** are the most reliable of the indoor sports, for the reason that they give active employment and exercise to both mind and muscle.

Bowling is an aid in overcoming constipation because it strengthens the abdominal muscles, massages the colon through the constant bending of the body, and diminishes the amount of abdominal fat.

Physiologic and Other Effects of Exercise.—Bodily exercise acts locally on the gastro-intestinal tract, and in this way assists directly in making the stools more frequent. As an indirect result, through the strengthening of the vascular, nervous, and muscular systems, valuable aid is rendered in building up all parts of the body, with improvement of the general health and vitality. I have many times witnessed the beneficial effect of exercise in overcoming the constipated state, and do not hesitate to recommend this therapeutic agent to persons suffering from insufficient and delayed evacuations.

Briefly *summarized*, the following are some of the principal ways by which exercise helps to relieve and cure constipation and its concomitant symptoms:

(1) It strengthens the heart action and augments the arterial, venous, and lymphatic circulation, thus favoring more complete absorption, improved nutrition, and effective elimination.

(2) It increases the elimination of carbonic acid and causes a more perfect oxygenation of the body, owing to the additional amount of fresh air inhaled.

(3) It promotes deeper breathing and this gives to the diaphragm a wider range of motion, which in turn serves to massage the liver and the transverse colon, thus causing an increased flow of bile and a more energetic peristalsis.

(4) It tends to soften the feces by stimulating the secretory functions of the pancreas, liver, and intestinal glands.

(5) It relieves manifestations of auto-intoxication by stimulating the emunctories promptly to eliminate accumulated poisons.

(6) It aids expulsion in the act of defecation by improving the condition and tonus of the abdominal muscles.

(7) It augments peristalsis through its tonic effect upon the intestinal nerves and muscular fibers.

Exercise also helps to improve the condition of this class of sufferers by diverting the mind, exhilarating the spirits, inducing sleep, improving digestion, and toning up the muscles and organs of the entire body.

The effect of exercise upon the bowel is pronounced, and there has been considerable discussion as to the manner in which this beneficial action is brought about. Some writers claim that the increased oxygenation resulting from exercise and fresh air serve to stimulate peristalsis, and maintain further that an increased amount of carbonic acid within the system hinders the intestinal movements.

Many persons, especially women, suffering from constipation are shallow breathers, and their skin performs its function poorly; as a result, too little oxygen finds its way into the circulation, to the detriment of the body.

To meet this condition in my constipated clientèle, I have for a considerable time past made it a practice to give them *intestinal oxygen baths.* The bowel is filled with oxygen introduced through a colon-tube connected with a second pipe which leads to the tank (Fig. 141). I have had ample opportunity to study the effect of the oxygen employed in this way, and have observed, in most cases, that it produces a sensation of exhilaration, but I have never known it to start up peristalsis. I have also frequently employed carbonic acid gas in the same manner for the relief of catarrhal, ulcerative, and other affections of the colon, but have never known it to inhibit peristalsis.

Personally, I am of the opinion that the good effect of exercise upon the intestine is due primarily to its mechanical action, and secondarily, to the effect of the improved circulation which is manifested in all parts of the body.

Medical Gymnastics.—By regularly practising for a considerable time certain bodily movements, either alone or in conjunction with the forms of exercise already discussed, sluggishness of the intestine can in most instances be markedly improved or entirely overcome. These exercises can be carried out equally well in the gymnasium or at the patient's home, and the movements can be practised with and without resistance. In obstinate cases, where resistance is desirable, it is advisable to have some one bend or twist the body when the subject *resists* his efforts, in order to bring into full play the muscles in training, to compress the lymph-spaces, to improve the abdominal circulation, and to diminish the quantity of fat of the abdomen or part under treatment. Medical gymnastics should not immediately follow a hearty meal, nor should they be indulged in until after the bladder has been completely emptied, but they may be advantageously practised at other times. When this form of exercise is carried out at home, the most convenient time is either on arising in the morning or just before retiring.

Tight-fitting clothes interfere greatly with bodily movements, and should be discarded during the exercise for pajamas, a gymnasium suit, underwear, or other loose-fitting garments. To be effective, the movements should be gone through with systematically and faithfully day after day for several weeks or months. In the beginning the exercise should be light to avoid soreness and fatigue, but as the patient becomes accustomed to the work, the number of movements can be increased and the period of exercise gradually lengthened.

Medical gymnastics properly executed excite deeper respiration and a more perfect bodily oxygenation, and the deep breathing also causes decided up-and-down movements of the diaphragm, which serves to stimulate the liver and intestine. They also strengthen the abdominal muscles, augment the portal circulation, relieve congested viscera, stimulate peristalsis, and remove superfluous adipose tissue.

Many different *bodily movements* have been suggested for the relief of chronic constipation, but I have come to rely mainly upon the following, which I have found most simple and effective:

(1) Stand erect with the legs together and slowly bend the upper part of the body to the left as far as possible, and then to the right in the same manner.

(2) Assume the erect posture and rotate or turn the body upon the hip.

(3) Take the same position and, without bending the knees, slowly lean forward and downward until the tips of the fingers touch the floor in front of the toes.

(4) Lie flat upon a firm bed, table, or couch, with the legs held rigidly together, and raise the body until it is at or near a right angle to the limbs.

(5) Reverse the procedure by raising the stiffened limbs until they are at a right angle to the body.

(6) While still in the recumbent posture, flex the knees and draw the thighs closely up against the abdomen.

(7) Kneel upon the floor and, with pelvis fixed, bend the body in succession forward, backward, from side to side, and then rotate it as far as possible, first in one direction and then in the other.

(8) Standing erect, with hands crossed behind or extending fully above the head, quickly change to the squatting posture.

(9) Lean slantingly forward and repeatedly draw up the abdominal muscles, and then relax, taking deep respirations, to exercise the diaphragm and the abdominal muscles.

(10) Extend both arms at a right angle from the body, so as to form a straight horizontal line, and, with the arms held in this position, walk six or eight times *on tip-toes* from one end of the room to the other.

The above movements should be repeated from five times for the beginner to ten times for persons accustomed to the exercise, and are more effective when practised systematically, the one after the other, and for a period of time varying from fifteen minutes to one-half hour.

In the beginning, once daily is sufficient, but later on they may be carried out twice daily, and, as a rule, if persisted in, they become a habit, and the exercise is looked forward to with pleasure.

Now and then patients are encountered to whom medical gymnastics are distasteful; for those I usually suggest for a substitute one or more of the *pulley* or *rowing* devices now on the market, and have frequently known patients suffering from costiveness to improve their condition by having recourse every day to these lighter forms of exercise. The above-described bodily movements render valuable aid in correcting chronic constipation due to atony of the intestine alone or when complicated by a fat abdomen, as well as separated or weakened abdominal muscles.

Other Forms of Exercise.—Constipated individuals who cannot command the services of a physician or masseur to give them baths, electricity, mechanical vibration, or massage, should obtain a *cannon-* or *bowling-ball*, *muscle-beater*, or some one of the numerous *massage rollers* (Fig. 133), and exercise with them. Of the above-named paraphernalia, a five-pound ball, covered with flannel or chamois skin and having an attached handle, is the most useful. A number of my constipated patients have derived great benefit from repeatedly rolling the ball from right to left over the course of the large bowel daily before arising and after retiring. In prescribing this simple form of massage, it is necessary to emphasize to the patient the importance of relaxing the abdominal muscles during the exercise. Massage rollers should be employed in the same manner as the cannon-ball when the object aimed at is to stimulate and exercise the colon in order to overcome the constipated state. Neither the ball nor the roller should be used when cold, for this would give rise to serious discomfort.

Muscle-beaters come with a long whalebone handle, to the end of which is attached a rubber ball, and are designed with a view to stimulate muscular contractions by repeated striking of the muscle with the ball. They are of some value in strengthening the abdominal wall, but otherwise are of but little if any use in the treatment of chronic constipation.

Before concluding this part of the discussion, I wish to mention the "oscillator," a machine with a belt attachment, which can be run by electricity, steam, or water power. When this apparatus is employed to correct constipation, the patient stands with the back to the machine and adjusts to the abdomen the broad connecting belt, against which he leans heavily while the oscillator is in motion. The quivering or shaking motion of the abdomen and contained viscera which ensues exerts a beneficial action upon the digestive organs and stimulates the colon to renewed activity.

CHAPTER XIX

HYDROTHERAPY

General Remarks.—Hydrotherapy, considered from a simple or practical standpoint, means the treatment of disease by water, irrespective of the manner of application.

Water intelligently employed represents one of the best, if not the most reliable, of the manifold agents enlisted in the physician's service for the relief and cure of chronic constipation and kindred conditions. This physiologic therapeutic agent is not used so frequently for this purpose as it is justly entitled to be. I have cured a great many persons afflicted with obstinate constipation simply by the persistent use of water in one form or another, and have found it serviceable in the treatment of acute or atonic spastic and mechanical costiveness (obstipation).

Fig. 96.—Plunge or swimming bath.

A great deal can be accomplished by water alone, but quicker and better results are obtained when hydriatic procedures are supplemented by judicious exercise, regulation of the diet, abdominal massage, electricity, and mechanical vibration.

The physician who attempts to relieve and cure all cases of constipation by means of a *routine* medical treatment, or by the exclusive use of some *one* particular therapeutic agent, will meet with failure, while he who ferrets out all the etiologic factors entering into the case and proceeds to take the necessary steps, will meet with abundant success in the treatment of this common and persistent complaint.

This makes it necessary for the attending physician to have a conveniently located hydriatic establishment and irrigating room, as well as localities equipped with vibrators and a complete electric outfit, so that the various features in the treatment may be combined to suit the individual case, with the least discomfort to the patient. Constipated subjects usually recover more promptly when they remain in a well-equipped sanitarium or hydriatic institution than when treated in their home or at the office of the physician. While this is true in a general way, it cannot be denied that a great deal may be accomplished in the handling of this class of cases outside such an institution by the physician, who, through his ingenuity, contrives a *home* system of baths, massage, and electric treatment, simple but at the same time sufficiently effective to accomplish its purpose. Hence, physicians should not be deterred from resorting to hydrotherapy in the handling of their costive clientèle merely because they have not the advantage of a hydriatic institution.

I shall have nothing to say at present about *mineral waters*, for the reason that these will be fully described in the chapter devoted to the Medicinal Treatment of Constipation.

Formerly it was claimed that the benefit derived from the *water cure* was due exclusively to the contained mineral ingredients, no matter how the water was administered—internally or in form of baths and douches. Modern hydrotherapeutists have exploded this theory and demonstrated that the good results derived from hydriatic procedures are, in the main, due to the thermic, mechanical, solvent, or gaseous action of the water, alone or in combination. The purest water obtainable should be used both for drinking and bathing purposes; hard water, containing an excess of lime, is constipating and otherwise unfitted for hydriatic purposes until it has been boiled.

I will not discuss the various hydrotherapeutic procedures which have been suggested for the cure of constipation and allied conditions, but will describe those which I have found to be the most practical and effective, after pointing out the fundamental principles of modern hydrotherapy. These refer alike to the effects of water when applied to the skin or to the hollow viscera, such as the stomach, colon, or rectum.

Cold water, briefly applied, causes a primary contraction of the superficial capillaries with a relaxation of the deeper vessels. Secondarily ensues the dilatation of the surface vessels, popularly known as the "glow," and an improvement of the general circulation, constituting the so-called "hydriatic reaction," the cardinal feature of hydrotherapy. Hot-water applications induce a direct primary vascular dilatation, but with this difference, that the general effect is relaxing rather than tonic in character. When long continued, cold and hot applications alike give rise to a paralytic dilatation of the blood-vessels.

Besides the local effect of water application, the simultaneously arising reflex influences in the distribution of the blood are of importance in this connection. As a result of cold applied to the abdomen, the intra-abdominal vessels contract in their turn, and the circulatory conditions in the cranial cavity are modified.

Cold increases the blood-pressure and diminishes the number of contractions of the heart. Warmth lowers the blood-pressure and increases the pulse. Cold applications over the body increase the specific gravity of the blood, the number of erythrocytes, and leukocytes. The respiration is stimulated by the resulting increase in the number and depth of the respiratory movements. Cold stimulates the activity of the muscles, whereas warmth lowers it. Short cold or very hot applications stimulate peristalsis, while continued cold or warmth lowers it and, finally, paralyzes the gut.

The action of the skin and of the kidneys is increased by all factors which augment the blood-pressure; this is especially noticeable in the "short" cold application.

Hydriatic measures employed in the treatment of constipation may be divided into (*a*) **internal**—water drinking, enemata, and enteroclysis (lavage); (*b*) **external**—baths, douches, compresses, packs, etc.

CHAPTER XX

INTERNAL HYDROTHERAPY

INTESTINAL IRRIGATION (ENTEROCLYSIS) AND ENEMATA

THE two procedures serving for the introduction of water into the bowel by way of the anus are designated as (*a*) intestinal irrigation (enteroclysis) and (*b*) enemata—hydriatic procedures often confused with one another. *Irrigations* are employed principally for the purposes of healing local lesions of the mucosa, cleansing the bowel of toxins or putrefying foods, or in order to stimulate the heart action and the function of the emunctories, etc.; while, on the other hand, enemata are to be retained and are used to stimulate peristalsis, soften hardened fecal masses, and to secure an immediate stool without the aid of purgation.

Irrigations and enemata are designated as *high*, when the water is deposited in the colon, and *low*, when it is injected into the rectum. The total capacity of the gastro-intestinal tract is approximately 8 quarts (8 liters). Of this amount the stomach and small intestine can take care of 4 quarts (4 liters) and the colon, sigmoid, and rectum of the remainder. The quantity of water that can be introduced into the bowel is variable and depends upon the capacity of the individual gut (the intestine in some persons is twice as long as in others), irritability of the intestine, temperature of the water, and the dexterity of the nurse or doctor giving the irrigation or enema.

I have treated patients in whom it was impossible to introduce more than 2 or 3 pints of water, and even this small amount caused discomfort or intense pain; again, in other cases, I have been able quickly to inject from 4 to 6 quarts with but little inconvenience or discomfort to the patient. These experiences have led me to believe that the large bowel is not only variable in size, but is very much more sensitive in some individuals than in others. Certainly the distention pain caused by the injection of the same amount of water, under similar circumstances, will cause one individual to suffer more than another.

Ordinarily, water does not pass the cecum; but in a few instances, with the patient in the exaggerated Sims, dorsal, Trendelenburg, or inverted positions, I have been enabled to force water through the iliocecal valve and irrigate the small intestine, judging from the amount of water injected. Cases have been recorded where under a high pressure water has been driven through the intestine into the stomach and out at the mouth—a feat which I have never seen accomplished. High pressure is not only unnecessary, but is positively harmful under all circumstances, and is especially dangerous in the presence of intestinal ulceration. When copious high enemata are employed, the water collects in the cecum, transverse colon, and sigmoid, and by its weight stretches and drags these segments of the intestine downward and otherwise injures the bowel; hence, it is not advisable to introduce large quantities of water into the colon, except when absolutely necessary to cleanse the bowel of toxins and scybala, for purposes of medication, or when employed hot to relieve spastic constipation.

Many persons inject from 3 to 4 quarts of water into the bowel daily in order to secure the morning evacuation. This custom should be discountenanced because it is both a vicious and unnecessary practice for the reason that the same results can be obtained by other and less harmful means, and if an enema must be employed, by using a much smaller quantity of water (2 pints). Ordinarily, the injection of from 1 to 2 pints of water into the rectum is sufficient to bring about a prompt evacuation and to cleanse the bowel, and not infrequently a much smaller quantity will accomplish the same result. It does far less harm to employ 3 quarts of water at three different times, than it does to use this amount in a single injection. Experience has demonstrated to my satisfaction that small, cool, high or low enemata may be resorted to frequently for a long time and do but little harm; something which cannot be said of copious hot or warm irrigations and enemata.

The beneficial action of water in the treatment of constipation is due to its *thermic*, *mechanical*, and *solvent* qualities (see chapter on Water Drinking).

In administering enemata and irrigations for the relief of constipation, it is important that the temperature of the water be regulated to meet the indications of the individual case. The temperature of the water used in the treatment of constipation varies in very wide limits, from very cold (50° F.) to very hot (125° F.), or almost any temperature between these extremes. In *chronic habitual constipation*, cold water is indicated because of its tonic effect, and when intelligently employed it does a great deal toward relieving and curing this obstinate condition; while, on the other hand, in the treatment of *spastic constipation*, warm or hot water is preferable to cold because it soothes the bowel and relieves enterospasm.

In obstinate or habitual costiveness the best results are obtained from a daily injection into the colon of from 1 to 3 pints of cold water, at a temperature varying between 70° and 80° F. The value of these cold applications is enhanced by the double-flow irrigator (Fig. 102), by means of which the water can be maintained at the desired temperature as long as may be necessary.

Gradually, and in proportion as the evacuations become normal in amount and number, the frequency of the injections or irrigations should be diminished, and the temperature of the water lowered until it has reached 65° or 70° F. Very cold water (50° F. or thereabouts) causes a great deal of discomfort, and a disposition on the part of the bowel to contract and cause its immediate expulsion.

When the atonic condition is confined to the rectum alone, cold-water enemata should never exceed ½ pint, and should be frequently repeated; not, however, with the idea of securing an immediate evacuation, but with the object of effecting a permanent cure through the tonic action of the water upon the bowel.

Chronic costiveness is usually caused or complicated by intestinal atony, dilatation of the colon, deficient glandular secretion, obtunded sensibility of the mucosa, inefficient peristalsis, inactivity of the emunctories, impaired circulation, and auto-intoxication, all of which conditions can usually be relieved or cured by hydriatic treatment.

Cold enteroclysis and enemata are followed by a powerful reaction, which directly or reflexly appears to benefit the whole body, more especially the gastro-intestinal tract. Water employed in this way acts not only as an irrigant and solvent to cause evacuation of the retained feces, but as a powerful tonic, which tones up the intestinal musculature, increases peristalsis, causes the glands to secrete more mucus, which lubricates the bowel, improves digestion, augments the circulation, and diminishes auto-intoxication through stimulation of the activity of the skin, kidneys, and liver.

Constipation due to acute proctitis can be relieved in short order by alternating cold (60° F.) and hot (110° F.) enemata; the former to be retained for five, the latter for ten, minutes.

Hot-water enteroclysis may be used to advantage in the treatment of both spastic and atonic constipation, though it is employed very much more frequently for the relief and cure of the former.

Turck (Chicago) has demonstrated that the action of very hot water (131° F.) increases peristalsis, the motor power of the stomach, and the flow of urine, while a lower temperature (104° F.) produces none of these results.

Hot-water (105° to 110° F.) enemata are indispensable in the treatment of enterospasm (spastic constipation), which interferes with the fecal current by producing partial or complete obstruction. Relief from such intestinal spasms is obtained more quickly when hot enteroclysis is reënforced by hot fomentations applied to the abdomen directly over the segment of contracted gut. I have witnessed the prompt recovery of a great many patients with spastic constipation of variable standing after the intelligent and persistent use of the two hydriatic procedures just mentioned. I have also relieved many patients suffering from flatus, colic, sphincteric spasm, rectal tenesmus, acute proctitis, inflamed hemorrhoids, prostatitis, abdominal and pelvic inflammation, and irritability of the abdominal and intestinal muscles, with hot water applied to the abdomen or injected into the bowel.

The beneficient action of water on the conditions named is due principally to the high temperature, which has a soothing effect upon the muscles and bowel, causing the fibers to relax and permit the feces to pass. Through its sedative action, it also does a great deal toward the relief of pain and irritability, while lessening inflammation in or near the bowel.

Warm (100° F.) and hot (105° to 110° F.) high and low enemata are of still further service in the treatment of spastic and atonic constipation by the removal of toxins of all kinds and scybala, which otherwise would accumulate and do great harm. As a result of the injections an extra amount of water is absorbed, which serves to stimulate the function of the skin, kidneys, and liver, causing a more perfect elimination, and thereby helping to prevent and relieve *auto-intoxication* and its dire results.

Enteroclysis and **enemata** are resorted to also for purposes other than the treatment of constipation, for they are frequently employed to relieve surgical shock, increase the volume of blood after copious hemorrhages, irrigate inflamed, ulcerated, and otherwise diseased intestines, and carry nutriment into the colon after surgical operations upon the throat, esophagus, and stomach; also in the treatment of gastric ulcer, gastric dilatation, or hematemesis and other conditions wherein the administration of nourishment by way of the mouth should be avoided.

Copious injections, as a rule, are *contra-indicated* in patients suffering from phthisis, arterial sclerosis, dilatation of the heart, strangulated hernia and stricture, ulceration, dilatation or enteroptosis of the colon. In the presence of a stricture the water will be retained and cause intense pain; when there is ulceration, rupture and peritonitis may ensue; when the colon is dilated, the already stretched and weakened muscular fibers suffer further damage, and when the gut is displaced, this condition is markedly aggravated, for the reason that the weight of the water causes a still further sagging.

Technic.—The technic of enteroclysis and rectal injection is much more difficult than is generally supposed by both physicians and nurses. The most essential features of this procedure are the *position* of the patient and the *apparatus* employed to conduct the water into the bowel.

The following are the *positions* most generally resorted to for purposes of intestinal irrigation, named in the order of their importance—viz.: (*a*) dorsal, (*b*) left or right Sims' (Fig. 83), and (*c*) the knee-chest (Fig. 84). Better results are obtained when the hips are elevated and the patient's position is changed from time to time if the water does not readily enter. Water or other fluids can be introduced into the rectum and all parts of the colon quickly and with little discomfort to the patient by means of a suitable syringe, if the person giving the injection will use a little patience. The water can be made to move from one part of the bowel to another by having the patient turn from left to right, or vice versa, as occasion demands. Because of the tendency of the abdominal or pelvic organs to drop downward and obstruct the bowel, the sitting posture is not advisable for injections, except when it is desirable to secure an immediate evacuation by throwing in a small quantity of water. If the patient is a child, enemata can be most effectively given with the child lying upon its abdomen and across the lap of the mother; but the dorsal, knee-chest, or Sims' posture may be used, if desirable for any particular reason.

The *apparatus* used for the purpose of injecting water into the bowel may be *simple* or *elaborate*, and I might add that the former will, as a rule, prove the more durable, effective, and less expensive of the two.

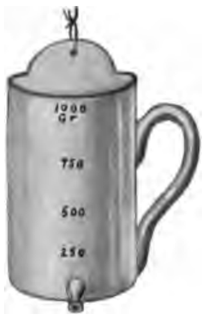

Fig. 97.—Graduated container for irrigating fluids

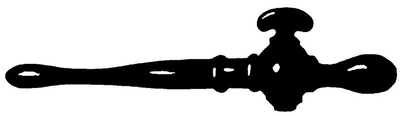

Fig. 98.—Irrigating nozzle with stop-cock.

The essential parts of any irrigating outfit consist in the *container* (Fig. 97) for the fluid and the *tube* (Fig. 98) through which it flows into the bowel. The following paraphernalia are most generally used for giving enteroclysis and high and low enemata—viz., the fountain (Fig. 99), Davidson (Fig. 100), and piston syringes (Figs. 101, 106), and different kinds of special apparatus. Of the first three, the fountain syringe is the most satisfactory where the medium to be injected is a thin fluid, while the last two are preferable when force is required to inject oil or any thick solution.

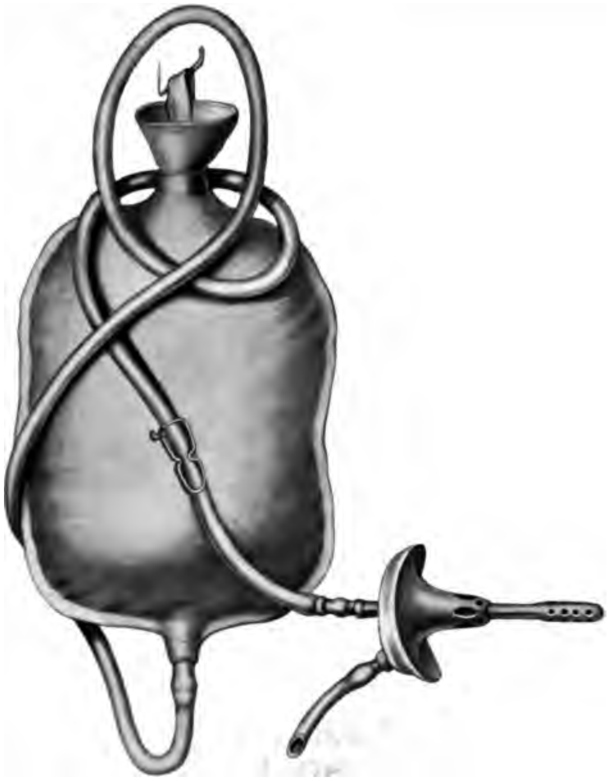

Fig. 99.—Fountain syringe with return flow irrigating attachment.

The tubes through which the water is carried into the bowel are variable in size, shape, and length, and may be made of metal and soft or hard rubber. They should invariably be smooth and of such size and shape as not to cause irritation or pain when introduced. Irrigating tubes should vary in size from ⅜ to ½ inch in diameter for ordinary purposes, and from ¾ to 1 inch when employed to soften and wash out impacted feces from the rectum. Irrigating pipes when short (2 to 6 inches) are called *rectal-*, and when long (18 to 36 inches), *colon-tubes*. Soft-rubber colon-tubes are employed for giving high colonic irrigation and enemata, and the short soft or hard pipes for washing out the rectum (Fig. 102). The long tube is convenient, but not necessary, in all cases for high irrigation, because by elevating the patient's hips and having him change his position from time to time the water injected through the short tube can be made to enter any part of the bowel. Unless contra-indicated, the water used for high and low enemata should be warm (not hot), and allowed to flow slowly into the gut in order to avoid the discomfort and pain which ensues when it is cold or is permitted to rapidly distend the intestine.

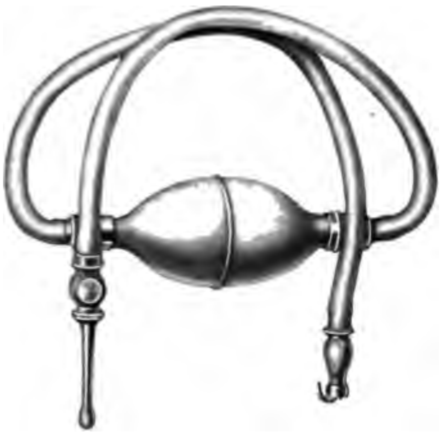

Fig. 100.—Davidson's syringe.

There are two types of irrigators—viz., tubes which permit of a *single* or *in-flow* (Fig. 102, A, C, D; 103) and those which have a *double* or both an *in-flow* and an *out-flow* (Fig. 102, B). The single-bore pipe is used when the fluid is to be injected and allowed to remain, and the return flow irrigator when it is desirable to medicate the bowel, wash out poisons or scybala, or to keep water at even temperature. The double-flow tube provides the mechanical, thermic, and solvent action of the fluid without causing the discomforts and pain from distention incident to its introduction through the ordinary tube. On the other hand, when it is desirable to have water or medicated solutions retained, the single-bore pipe should be selected. I prefer the opening to be in the end rather than in the side of the tube or irrigator in order that the water may run directly through it and dislodge feces, a fold of mucosa, or a rectal valve which interferes with its passage.

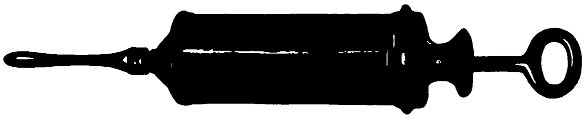

Fig. 101.—Hard-rubber baby enema syringe.

Irrigating pipes of all kinds should be made in such a way and of such material as to permit frequent sterilization. Of the many double-flow irrigators the Kemp (Fig. 135) and the Barger are the most satisfactory, and of the two I prefer the one devised by my friend, R. C. Kemp, of New York, because it is simple and effective.

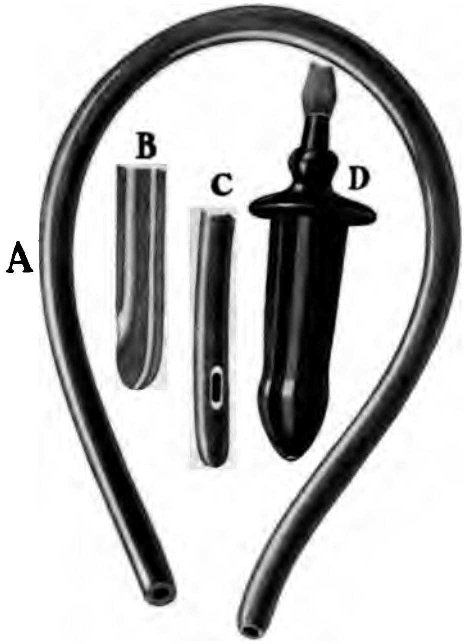

Fig. 102.—Enema tubes: A, Ordinary colon-tube with opening in the end; B, Murray's double-flow tube; C, pipe with eye in the side; D, hard-rubber dilating irrigator.

After experimenting for a number of years with different instruments, I am convinced that the irrigating apparatus described below is the most satisfactory for office and hospital use.

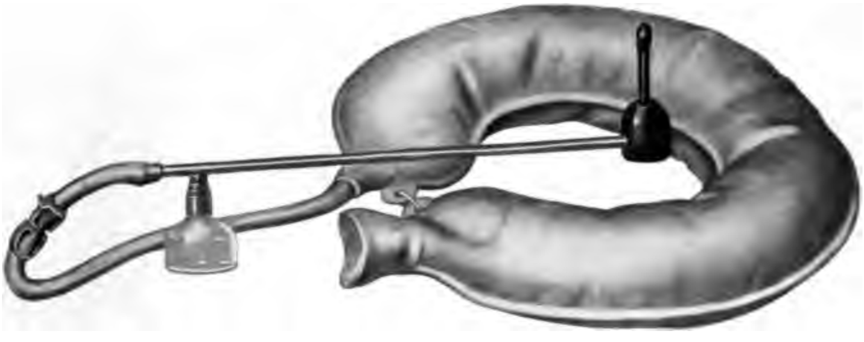

Fig. 103.—Jamison's seat syringe.

The apparatus (Fig. 104), which explains itself, is employed in the following manner: Introduce the colon-tube (*a*) into the bowel and turn stop-cock (*b*) so that the fluid enters the intestine under pressure regulated by the amount of air which is forced into the bottle (*c*) by the

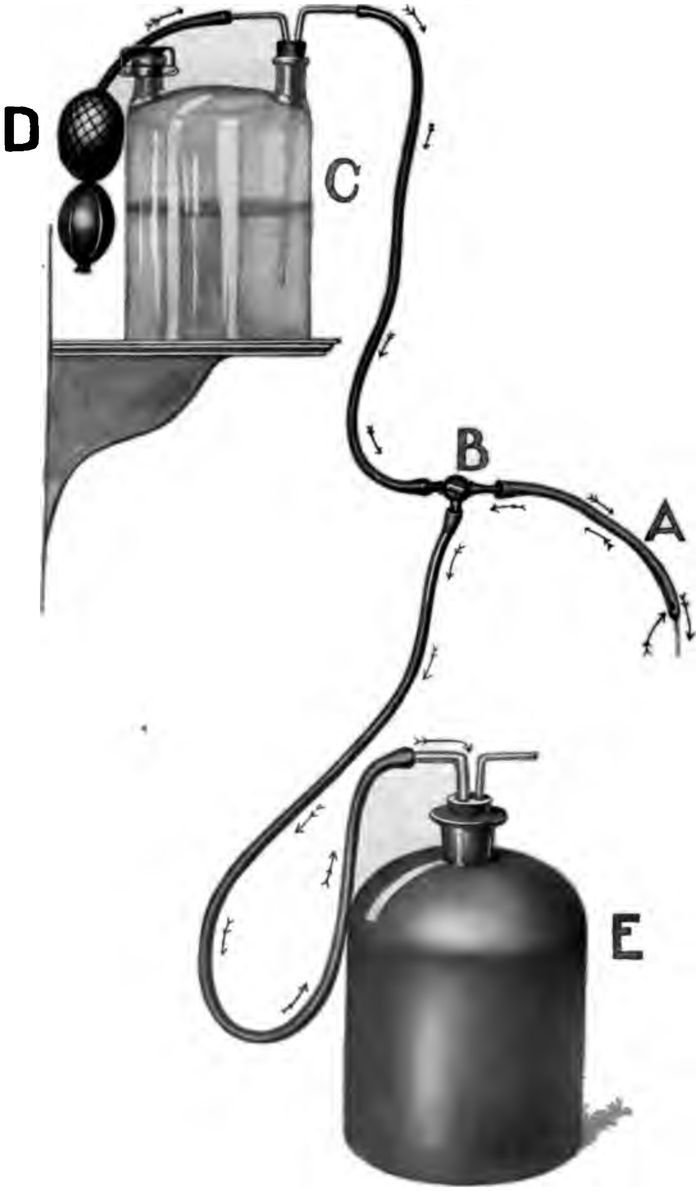

Fig. 104.—Apparatus used in author's office and sanitarium.

rubber hand-bulb (*d*). By reversing stop-cock (*b*) the flow from the bottle (*c*) is arrested, and the irrigating fluid returns from the bowel and passes downward into bottle (*e*). The contents of the bottle (*e*) can be satisfactorily deodorized by placing a small amount of permanganate of potassium, charcoal, or ichthyol in the bottle.

A low or a high irrigation or lavage can be administered by altering the pressure, and the fluid be retained for as long or as short a time as may be desired. This plan of injecting water into all parts of the large bowel is simple, clean, and effective. Another satisfactory procedure is to connect one end of the long colon-pipe with a funnel (Fig. 105), insert the tube to the desired height, and then pour the fluid or oil into the funnel, from which it will soon find its way into the bowel when raised above the patient, lying in the Sims or dorsal posture. Still another effective way of introducing oil is to connect the long colon-tube with a strong metal syringe (Fig. 106).

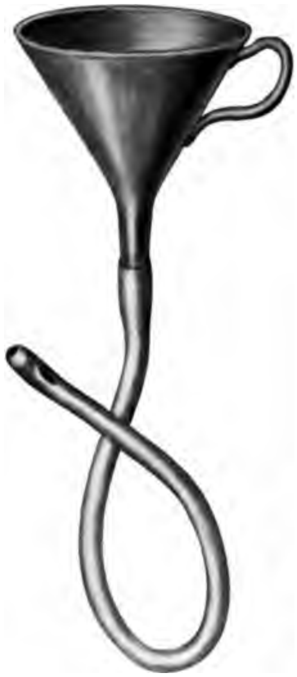
Fig. 105.—Funnel and tube, an effective method for the administration of oil and other thick enemata.

Oil should not be employed in the fountain syringe because of its tendency to stick in the long tube and to rot the rubber after a few injections.

It is an easy matter to insert a short or *rectal* tube, but the successful introduction of the long or *colonic* tube under all circumstances requires a great deal of skill and ingenuity. The technic of passing the latter is as follows: With the patient preferably in the Sims or knee-chest posture, the pipe, properly warmed and lubricated with vaselin or some other stiff lubricant, is grasped by the fingers of the right hand about 2 inches from the end; it is then gradually and slowly inserted into the rectum with a side-to-side or boring motion, while the buttocks

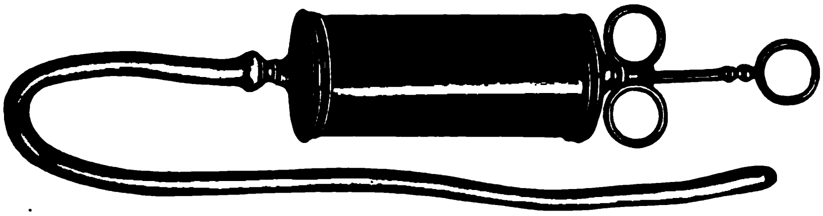
Fig. 106.—Metal piston syringe and colon-tube.

are separated with the fingers of the left hand. It is directed upward and forward until through the anal canal and past the levatores ani muscles, then upward and backward, and thence over the upper rectal valve and into the sigmoid flexure. In the lower part of the bowel, when necessary, the pipe may be guided by the finger inserted into the vagina or rectum. After the tube reaches O'Beirne's sphincter, its direction cannot be perfectly controlled, and it must be permitted to find its own way along the bowel. The principal anatomic obstructions to the introduction of the pipe named in their order from below are—viz., the sphincter muscle, folds of mucosa, Houston's valves, O'Beirne's sphincter, and the angulations in the bowel caused by the attachments of the mesosigmoid. When the sphincter is irritable, and contracts to prevent its entrance, the tube should be continuously pressed against the muscle until it relaxes and permits it to pass. By allowing the fluid to flow as it is passed upward, the pipe is stiffened, and this, together with the force of the water, does much toward displacing the valves, folds of mucosa, or scybala which might be in the way. When O'Beirne's sphincter spasmodically contracts to interfere with the passage of the tube, this difficulty is overcome by means of hot fomentations and the injection of warm water or oil into the bowel, soothing applications, which cause the intestinal musculature to relax and offer no further resistance.

Force should never be employed in introducing the colon-tube or long stiff bougies, because the bowel may be ruptured; and, for the same reason, it is not judicious to inject a very large amount of water at a single sitting.

When, for any reason, it is impossible to pass the long tube in the above-described manner, the sigmoidoscope or colonoscope should be introduced, the obturator removed, when the soft tube can usually be introduced without any difficulty to the desired height (Fig. 77). Once the water reaches the sigmoid, it can be made to enter all parts of the colon by elevating the hips of the patient and turning him from his left to his right side.

Ordinarily, the passage of the colon-tube causes the patient but little discomfort, except when it curls up in the rectum or other parts of the bowel, and if pain is complained of or the water does not flow, the tube should accordingly be withdrawn and reintroduced until it passes freely into the upper bowel. At times it is difficult to determine if the tube has reached the colon or not, but by using a little ingenuity one soon learns to determine definitely whether it has reached the desired height. When doubled up, it causes pain in the upper rectum and pelvis, tenesmus, and a tendency on the part of the bowel to expel it, the water will not flow, and when slightly withdrawn the tube comes out with a quiver or a jerk, and can be felt doubled up when the finger is inserted into the rectum or vagina. On the other hand, when the tube has reached the colon, the fluid runs freely, and when the water is hot or cold the patient at once feels it entering the lower bowel. Again, when the water does not find its way above the rectum, it is promptly evacuated, but when deposited in the colon it remains several minutes or hours.

Except when destined for a specific purpose, very cold water (50° to 60° F.) should not be used for irrigating purposes, because it excites a powerful contraction of the intestinal musculature and *enterospasm*, with prolonged retention of the water; or the contraction of the gut results in its immediate expulsion.

CHAPTER XXI

INTERNAL HYDROTHERAPY (*Continued*)

WATER DRINKING

Water, consumed at appropriate times in reasonable amounts and at a suitable temperature, does a great deal in preventing and curing constipation. I would rather discontinue the use of drugs in the treatment of costiveness than prohibit water drinking in this class of sufferers.

Medicine will unquestionably secure an evacuation more promptly in many instances than will water, but, on the contrary, water will bring about a permanent cure more quickly and do less harm than drugs.

Water, being a physiologic agent, facilitates metabolism and helps maintain the body equilibrium; while purgatives act as foreign substances and are not so well tolerated. Water increases the fluid of the body and is carried to remote sections to cleanse the cells and fibers; at the same time it aids in the elimination of waste material and noxious substances. The drinking of water serves to cleanse the interior structures of the body, while bathing does the same for the outer parts.

Water is healthful, but persons often drink too much or at *too high* or *too low* a temperature. In the treatment of constipation indiscriminate water drinking should be discountenanced. Consequently, when this therapeutic agent is employed, it should be with a definite object in view.

Except in special instances, water should never be ingested at a temperature below 50° F. or above 150° F., because, when frequently taken at these extreme temperatures, positive harm is done to the gastro-intestinal mechanism. The copious ingestion of water—the consumption of from 20 to 50 glasses of water daily by persons who believe the more they drink the better will be the result—must be condemned.

It is rarely necessary to drink more than from 10 to 15 glasses of water during the day, and usually from 5 to 6 are ample. The effect upon the stomach and intestine is much better when it is taken in small quantities (½ glass) at frequent intervals (one or two hours) than when the same amount of water is consumed at two or three draughts.

Water is but slightly absorbed in the stomach; consequently, when taken in considerable quantities, it is retained and interferes with digestion, distends the stomach, and, by its weight, causes sagging of this organ, favoring gastroptosis and enteroptosis—conditions which aggravate the constipated state. Ordinarily, constipated subjects should drink from 1 to 1½ glasses of water on arising, and lesser amounts at short intervals during the remainder of the day.

The pernicious habit of drinking several glasses of iced water at meal-time is very detrimental to health, because the water washes the food down before it is properly masticated, dilutes the stomach-contents, interferes with the circulation, diminishes gastric secretion, and in other ways interferes with the digestive process. This eventually leads to indigestion, dilatation of the stomach, constipation, and a host of other ailments. On the other hand, drinking of cool or cold water in moderation has a healthy influence upon the alimentary tract and other organs.

Drinking of cold water is contra-indicated in colic; in the treatment of very old and feeble persons; in gastric ulcer, arteriosclerosis, persistent anemia, diseases of the kidney, and in persons who are fatigued or overheated from any cause. Cool water produces a general tonic effect and stimulates the intestinal musculature and mucous glands to greater activity.

Ingestion of warm water has an opposite effect. It soothes and quiets the alimentary tract, relieves irritation and pain, diminishes or arrests enterospasm.

Copious water drinking favors the elimination of ptomains and poisons resulting from putrefying food and other causes; it softens the feces and in various ways improves the condition of patients suffering from constipation.

The beneficent effect of water in constipated subjects is due as much, if not more, to its thermic as to its mechanical and solvent action. In persons suffering from obstinate constipation I have witnessed many cures following judicious water drinking and attention to diet and hygiene of the bowel, together with efforts of the patient to secure an evacuation after the morning meal.

The increased volume of blood following water drinking is of short duration. Owing to this fact, it is necessary in cases of chronic constipation complicated by auto-intoxication to renew the water-supply as often and in such amounts as may be indicated in the individual case.

Under ordinary circumstances, where water is drunk to relieve or cure constipation, the temperature should be about 70° F. in mild, and from 60° to 65° F. in obstinate, cases. It should never be ingested at a temperature below 50° F., except when the sluggishness of the bowel is complicated by fever or in hypopepsia, etc., or in amounts of more than ½ glass every few hours.

When chronic biliousness and auto-intoxication are present, 1½ glasses of cold water, taken in the morning on an empty stomach, stimulates the stomach, liver, and gastro-intestinal tract, and in this way helps to regulate the stools and eliminate toxins from the bowel.

Drinking of *warm* and *moderately hot* water should be discouraged in persons afflicted with chronic habitual (atonic) costiveness, for the reason that a lethargic state and infrequent evacuations are induced through its sedative and relaxing action. Water at a neutral temperature of 96° to 100° F. acts the same way, but to a less marked degree. Very hot water (125° to 140° F.) stimulates peristalsis, but, owing to its harmful effect upon the stomach, it should not be employed except in cases of constipation complicated by hypopepsia, gastrosuccorrhea, and gastralgia; and then only when swallowed quickly and in small quantities.

From what has been said, it may be inferred that the temperature of water should be selected for constipated subjects with the greatest care, in order that the full effects of this hydriatic procedure may be obtained in the treatment of the various types of costiveness. To emphasize this fact and to recapitulate, it may be stated that *drinking of cold water* is advisable in *chronic atonic constipation* for the reason that it stimulates the local and general circulation, improves metabolism and assimilation, favors elimination of toxins of all kinds through its effect upon the skin, liver, and kidneys; increases peristaltic action, renders the nervous mechanism more responsive; causes a more abundant secretion of mucus for lubricating the bowel; softens the feces, preventing fecal impaction; augments gastro-intestinal digestion, and in other ways assists in toning up and improving the condition of the body, especially the gastro-intestinal tract; so that the stools become normal as regards quantity and frequency.

The above beneficial results following judicious drinking of cold water are due principally to the effect of the low temperature of the water upon the mucous membrane, which induces a powerful energizing reaction. Cold drinks produce contraction of the intestinal musculature and not infrequently colic; because of this tendency, drinking of cold water should be prohibited in persons suffering from enterospasm and intestinal obstruction.

In *spastic* constipation the fecal current is partially or completely blocked because of an occlusion due to simultaneous contraction of both the longitudinal and circular muscular fibers. Such enterospasms may occur at short or long intervals and last for several minutes, hours, or days.

Hot-water (110° to 120° F.) drinking has almost a specific action in relieving and preventing constipation of this type, for the reason that the high temperature of the water has a decidedly soothing effect upon the bowel; in consequence of which irritability is diminished and the contractions become less severe and frequent or entirely disappear. In many instances this condition can be relieved more quickly when the water drinking is reënforced by hot abdominal fomentations, which act in a similar manner. In addition to its sedative action, hot water taken internally is serviceable also in the treatment of *spastic* and *mechanical* constipation, for the reason that the additional water ingested liquefies the feces and softens any scybala which may be present, and helps to carry away mucoid collections.

Several cases have been recorded in which mechanical obstruction has been relieved by copious drinking of hot water. The good results obtained in this class of sufferers have been attributed to both the soothing effect of the water in reducing intestinal irritability and muscular spasms, and its mechanical action in dislodging the cause of the obstruction.

In conclusion, I would reiterate what has been said elsewhere, to the effect, that persons who drink considerable water to improve their general health and constipated state should not drink a water that contains lime, but a nearly pure one, such as Sun Ray or other equally wholesome water.

CHAPTER XXII

EXTERNAL HYDROTHERAPY

BATHS, RUBS, DOUCHES, COMPRESSES, AND PACKS

General Remarks.—Having discussed the *internal* hydrotherapeutic procedures, it remains for me to describe the *external* hydriatic measures indicated in the treatment of constipation under varying conditions.

Unquestionably, much benefit can be derived from baths, rubs, douches, compresses, and packs, properly employed, in the treatment of this complaint and its allied conditions. This, however, does not justify the conclusion that the good results obtained by persons taking the *water cure* are due entirely to the therapeutic value of the water. Much credit in the majority of such cases is due to the cessation of business, change of diet, habits, scenery and surroundings, and to the forced exercise in the open air required of patients taking the cure at the various Spas, at home and abroad.

I will discuss the external hydriatic procedures under the following headings: (*a*) Baths; (*b*) rubs; (*c*) douches; (*d*) compresses; (*e*) packs.

Before selecting the method to be employed and the temperature of the water, each case should be carefully diagnosed and the physical condition and temperament of the patient noted, in order that accidents may be avoided and the best results obtained.

Baths, rubs, douches, compresses, and packs may be employed cold, very cold, hot, very hot, neutral, or tepid, depending upon the object to be accomplished. In the treatment of constipated individuals the temperature of the water employed in the form of baths, rubs, douches, compresses, and packs may be used anywhere from 130° F. down to 50° F.

The beneficial effect of these hydriatic procedures is due mainly to the thermic action of the water, though the mechanical effect does much toward enhancing the healthy reaction following the application.

When it is desirable to exhilarate the patient, sharpen up his mental faculties, increase his capacity for work, or diminish his insomnia, cold water at a temperature varying from 65° to 70° F. will give satisfaction. Baths, rubs, douches, compresses, and packs at this temperature are invaluable in the treatment of chronic atonic constipation because they energize the circulation, especially of the abdominal viscera, improve the secretion of the digestive organs, augment peristalsis, and stimulate the mucous glands to greater activity.

In this class of cases hot (105° to 110° F.) water applications should never be applied because of their tendency to induce a state of depression, indifference, and lassitude; and further, because they diminish the activity of the skin, lessen peristalsis, and have a general relaxing effect upon the body. Neutral (92° to 97° F.) and tepid (70° to 80° F.) baths are not advisable in atonic costiveness, because they do not produce the reaction and toning up of the body so essential in these cases.

Hot and *warm* applications and baths cannot be too highly recommended in the treatment of *spastic* and *mechanical* constipation, alone or when complicated by increased sensibility of the abdominal organs, pain, colic, or muscular contraction accompanying acute inflammation of the abdomen, sphincteric contractions, proctalgia, and other painful and irritable affections of the anus, rectum, prostate, bladder, or female genital organs.

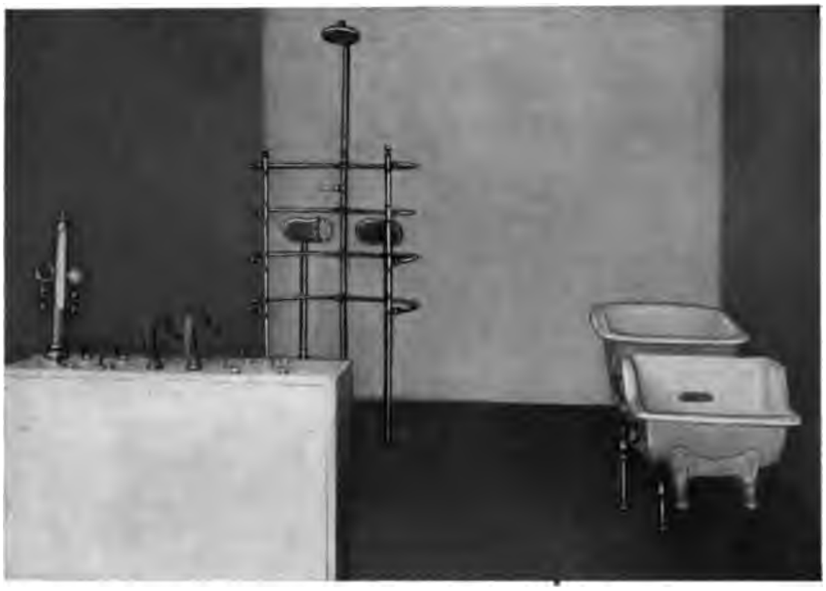

Fig. 107.—Bath and douche room. The table on the left shows the douche-tubes and valves for controlling the temperature of the water and force of the stream.

The beneficial results obtained are due principally to the soothing and sedative effect of the heat upon the nervous and muscular systems.

As a general rule, it is advisable to protect the head by wrapping a cold towel around it before the patient enters the bath, in order to avoid the discomforts and dangers of cerebral congestion.

External applications should always be made in a warm room, and the temperature of the water should not be too low in the beginning of the bath (Fig. 107), especially when the patient is old or feeble. A more powerful reaction can be obtained by brisk rubbing of the body during and following the application.

Baths.—Fresh, salt, or effervescing waters may be used for bathing purposes.

Many different kinds of baths have been described, but for my purpose they may be classified as follows—viz.: (1) Plunge baths; (2) immersion baths; (3) sitz-baths; (4) sweating baths.

Baths in one or more of the above forms render valuable aid in the treatment of constipation and auto-intoxication. Their importance in the treatment of this complaint is best understood by those who recognize both the excretory and secretory function of the skin.

Properly prescribed, and at a suitable temperature, baths tend to relieve habitual (atonic) constipation through their tonic effect upon the gastro-intestinal tract, and to cure spastic costiveness because of their soothing influence upon the nervous and muscular systems.

Bathing frees the body from impurities consequent upon perspiration, and opens up the pores of the skin, to permit the absorption of oxygen and the elimination of carbonic acid. It stimulates the skin, kidneys, liver, and intestine, so that they more effectively discharge poisons which would otherwise cause auto-intoxication.

Plunge Baths.—The plunge bath or morning dip is very popular and consists in sitting down for a few seconds in a tub half filled with water at a temperature varying from 60° to 70° F., or as it comes from the tap, while friction is actively practised upon the various parts of the body during the bath, after which the body is briskly rubbed with a Turkish towel until dry. A more popular but less effective way of taking a plunge or dip is to have the patient jump into a tub of cold water or the pool (Fig. 96), remain for a few seconds, and then step out, and have a brisk rub down, or take a cold shower of short duration, followed by friction with a rough towel. The thermic action of the cold water, together with the friction, act directly upon the nerve-endings and make a profound impression upon the circulatory, nervous, and muscular systems. The cold plunge gives a healthy glow and increased warmth to the skin, with a feeling of invigoration to the patient, and when practised for a considerable time has a hardening effect upon the body. This type of bath is of inestimable value in overcoming insomnia, mental torpor, lassitude, headache, listlessness, neurasthenia, sluggishness of the gastro-intestinal tract, defective nutrition, obesity, and auto-intoxication, which frequently complicate obstinate constipation.

The morning dip also tends to strengthen flabby abdominal and other muscles and to develop a weakened into a strong constitution.

Immersion (*Full*) *Baths.*—The full bath is very generally employed in the treatment of constipation, for the relief of fevers, and many other affections. The temperature of the water in this, as in other baths, needs to be regulated to meet the necessities in the individual case and may be employed cold or hot, cool or tepid. A very large deep tub is required for the immersion bath, so that the patient may be completely submerged with the exception of the head. The construction should be such that the inflow and outflow is under perfect control in order to regulate the temperature of the water, so that it may be rapidly raised or lowered, or graduated from one extreme to the other. This type is less frequently used in the treatment of constipation than the cold plunge.

Cold full baths (50° to 60° F.) should be but of a few seconds' duration, and when cool (60° to 70° F.) may last a little longer. During and shortly following the bath friction should be kept up, and then the parts should be dried with a rough towel to secure the most powerful reaction. The *cold* and *cool* immersion bath produces a general tonic effect, deepens respiration, favoring a better ventilation of the lungs and general oxygenation, improves digestion, assimilation, and elimination, the absorption of food, stimulates the appetite, increases peristalsis and glandular activity, and in many ways helps to overcome constipation. It improves commonly allied conditions, such as indigestion, enteroptosis, dilatation of the bowel, intestinal auto-intoxication, insomnia, migraine, and neurasthenia.

Cold and *cool full baths* are contra-indicated in spastic and mechanical constipation, acute inflammatory affections like appendicitis, peritonitis, and gastritis in children, old and feeble persons, in pronounced anemia, and during gestation.

Hot (105° to 115° F.) and *warm* (100° to 105° F.) immersion baths are employed to relieve and cure spastic constipation, for the reason that the heat has a sedative effect upon the contracted muscular fibers, so that they relax and allow the feces to pass on. These hot hydriatic procedures relieve pain, diminish intestinal irritability, and the rigidity of the abdominal muscles, which not infrequently accompany and aggravate mechanical constipation.

When a very powerful reaction is desired from a hot immersion bath, this can be obtained by adding salt, bran, pine-needle extract, mustard, turpentine, or other substances to the water, which will increase its stimulating effect upon the skin.

Sitz-baths.—The sitz-bath is very popular, especially with women, because it can be so easily taken, and further, for the reason that it accomplishes such good results in constipated subjects and in persons suffering from painful affections of the anus, rectum, bladder, and uterus. The only apparatus required for this hydriatic procedure is a *sitz* (Fig. 108) or ordinary bath-tub and a basin to place at the feet of the patient. The tub should be of such dimensions as to permit the hips and lower abdomen to become at least partially submerged, and there should be no sharp angles to cause discomfort to the patient. During the bath the head should be protected wth a cold towel and the feet be kept in warm water. The baths may be given hot (105° to 120° F.), cold (55° to 65° F.), tepid (75° to 80° F.), or at a neutral (92° to 98° F.) temperature. The hot, tepid, and neutral baths should be of longer duration (ten to twenty-five minutes) than the cold (five to ten minutes), and each should be accompanied and followed by friction (Fig. 108).

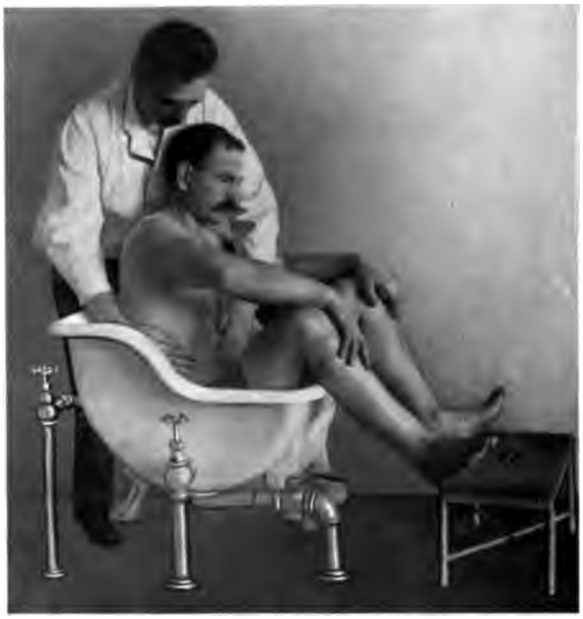

Fig. 108.—Sitz-bath with abdominal friction.

The *cold* sitz-bath is employed where a tonic effect is desired and will be found useful in the treatment of atony, dilatation, paresis, and ptosis of the intestine, locomotor ataxia, flabby condition of the abdominal muscles, inactivity of the glandular mechanism, and in local conditions of the rectum and adjacent parts, such as inflamed hemorrhoids, chronic proctitis, and prostatitis.

Hot, *tepid*, and *neutral* sitz-baths can be successfully employed to relieve constipation associated with painful affections of the urinary tract or the pelvis, and pain in and about the rectum, such as coccygodynia, sciatica, acute proctitis, strangulated hemorrhoids, sphincteralgia, enteralgia, and vesical irritability.

I know of no therapeutic agent which will give more comfort (and so quickly) to persons suffering from the above distressing affections than will the hot sitz-bath. It also has a specific action in relieving obstinate pruritus of the anorectal and vaginal regions.

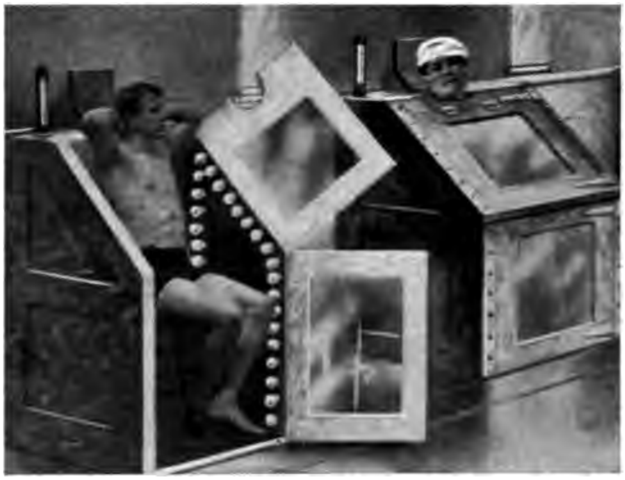

Fig. 109.—Electric-light cabinet, open and shut.

Sweating Baths.—A sweat bath to be effective must cause the patient to perspire profusely. This may be satisfactorily accomplished by: (*a*) Turkish, (*b*) Russian, (*c*) electric-light, (*d*) hot-air baths.

In the ***Turkish bath***, the patient remains in a room where a dry heat (from 110° to 125° F.) is maintained until he begins to perspire; he then passes into a second room, having a temperature of from 150° to 170° F., where he stays for ten to twenty minutes or longer, until perspiration becomes very free.

The ***Russian bath*** provides the beneficial action of hot vapor. The first room is vapor-heated to 115° to 120° F., while the second room is kept filled with steam at a higher temperature (140° F.).

A ***modified Russian bath*** may be given by placing the patient in a cabinet and allowing the vapor to enter until the desired temperature has been obtained.

The *electric-light bath* (Fig. 109) has been popularized through the efforts of Kellog of Battle Creek. The advantages claimed for this over other sweat baths are that the patient can be made to perspire more quickly without having to breathe hot air or vapor and at the same time enjoy the benefit of the actinic rays derived from the incandescent and arc lights which heat the cabinet. The temperature of the bath is under control, is regulated by turning on or off different sets of lamps, and can be made to vary from 110° to 150° F. or more. Recently constructed cabinets are made so that the light bath may be given independently of the sweating process. With the exception of lights, the electric-light cabinet is similar to the hot-air bath (Fig. 110).

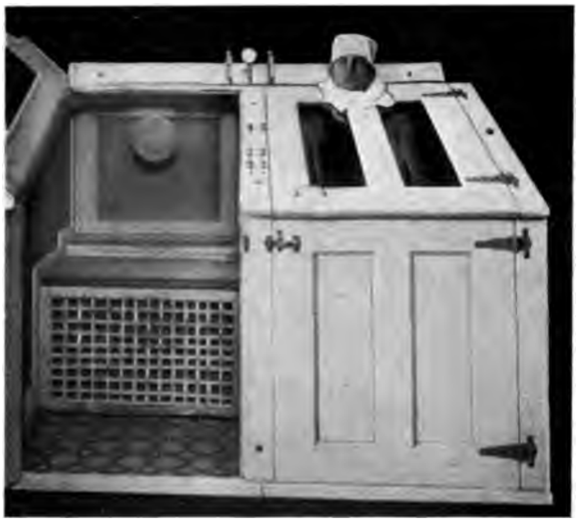

Fig. 110.—Hot-air bath : Cabinet on the left open, cabinet on the right closed.

In the *hot-air bath* the patient is placed in a cabinet heated to 120° to 180° F. by means of dry hot air, where he remains until he perspires freely.

In all of the cabinet baths the entire body, with the exception of the head, is enclosed.

All sweat baths should be followed by a gradual cooling off by means of the shower-bath or friction douche. In order to secure a more powerful reaction after the sweat bath the patient may be treated with the Scotch or the Charcot douche, salt or alcohol rub, general faradization, local or general massage.

Patients who do not perspire readily can be made to do so by having them drink a glass of cool (not ice-cold) water just before or during the bath.

Patients suffering from a weak heart, rheumatism, or gout should not be too quickly exposed to the higher temperatures, otherwise vertigo and syncope are sure to follow.

The sweat baths, in conjunction with the douches recommended, massage, and electricity, benefit constipated individuals because they tone up the body, make the muscles more supple and active, stimulate the emunctories, soothe or arouse the nerves, and in other ways help to improve the general condition of the patient.

Electrohydrotherapeutic baths are discussed in the chapter on Electricity.

Rubs.—The value of *sponge* and *full baths* can be materially enhanced by following them with a *salt rub*, which consists in briskly rubbing the skin with coarse wet salt, which is washed off with a cool spray or shower, and quickly drying the body with a soft towel.

The *salt rub* is invigorating, produces a healthy cutaneous glow, and through its chemical and mechanical effect upon the skin exerts a decided tonic and alterative action. It is a most valuable aid in restoring to health persons suffering from a weakened constitution, constipation, and other forms of chronic disease.

Oil rubs may be used to advantage in connection with the various baths, and oil, cocoa-butter, or plain vaselin may be employed for this purpose. Rubbing in of the oil makes the skin more pliable, favoring elimination and the supposed percutaneous absorption of oxygen, renders the muscles more supple and strong, and to a certain degree helps to build up the body because of the absorption of this additional amount of fat.

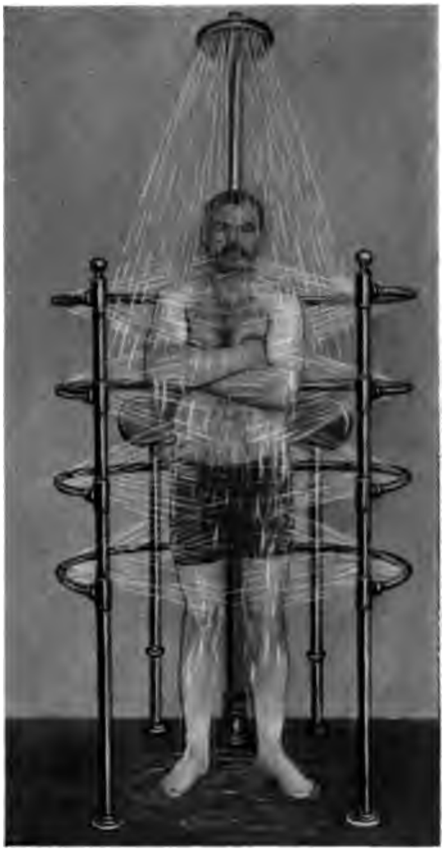
Fig. 111.—General rain or shower douche.

The *alcohol rub* may be employed to advantage in suitable cases following the bath. It invariably leaves a most pleasing sensation, and appears to benefit persons suffering from chronic constipation, who are in a run-down condition.

Boas has obtained good results in the treatment of habitual constipation through the reaction which follows the playing of a stream of ethyl ether thrice daily upon the abdomen.

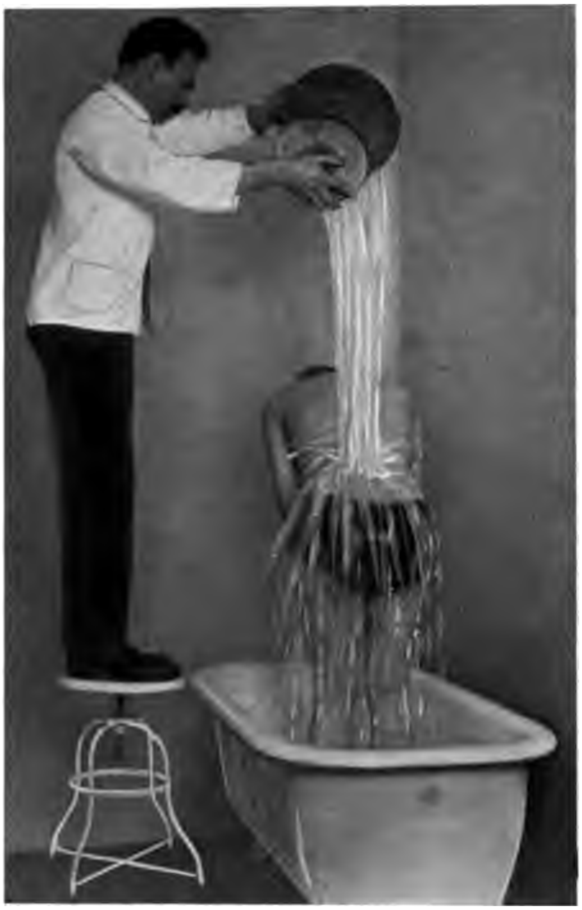

Fig. 112.—Pail douche.

Douches.—Of the many douches invented, only those will be discussed which have given the most satisfactory results in the treatment of chronic constipation.

Douches are designated as *rain* (Fig. 111), *pail* (Fig. 112), *fan*, according to the manner in which the stream of water is employed and the pressure used. Again, they are called, *spinal*, *abdominal* (Fig. 113), *hepatic*, *hypogastric*, *perineal*, and *anal*, depending upon the region of the body against which they are directed, and *massage*, when accompanied by friction. They may be given at *even* temperature, alternated, or graduated, and under light or great pressure, applied at close range or from a considerable distance (Fig. 113).

The *Scotch douche* is of the alternating variety and consists in submitting the patient to a high temperature by means of any of the sweat baths or local hot douches already described, from two to eight minutes, and then suddenly applying the fan, rain, pail, or other form of cold douche. In some instances the process may be advantageously repeated several times at short intervals.

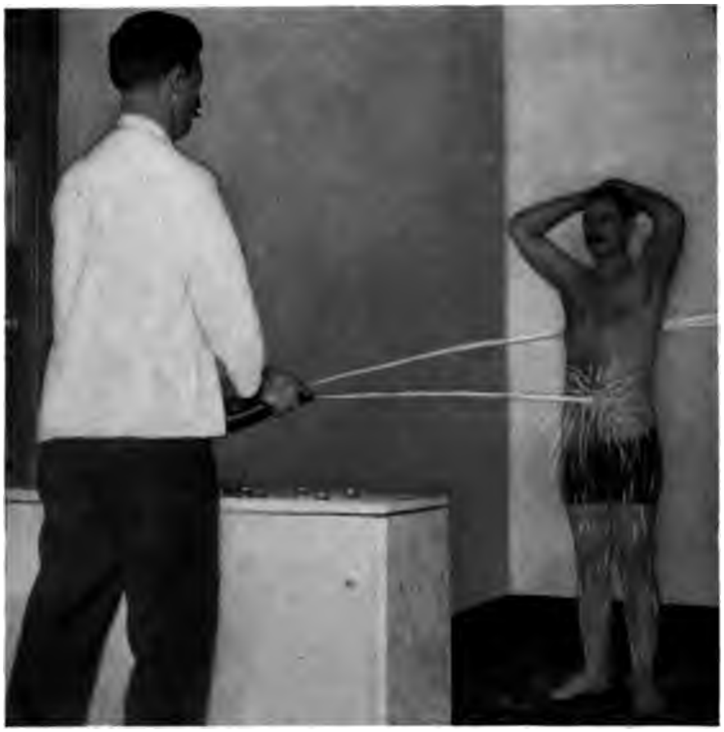

Fig. 113.—Abdominal Scotch or alternating hot and cold douche (the water under considerable pressure).

The *Scotch* (Fig. 113) is the most popular, and justly so, of all douches, for the reason that it is followed by the most powerful reaction, owing to the sudden change from one extreme temperature to the other.

The *rain* (shower douche, Fig. 111), next to the Scotch, is the most useful douche for general tonic purposes. The intensity of the reaction following this hydriatic procedure depends upon the pressure of the water, its temperature, the height from which it falls, and the number of streams which play upon the body.

The rain douche can be administered with the ordinary shower apparatus or by means of a hose having a nozzle well perforated with small openings. The reaction following the shower-bath is more marked when cold water is employed, and when the temperature is alternated by repeated rapid changes from hot to cold. Ordinarily the water is employed at a temperature of from 70° to 65° F. and has a fall of about 3 feet.

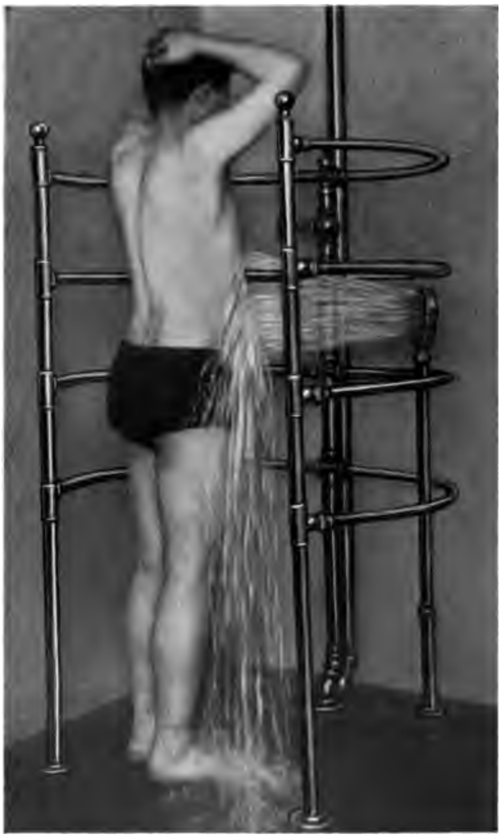

Fig. 114.—Liver (hepatic) douche.

In the *pail* douche (affusion, Fig. 112) the water is poured from a bucket directly upon the affected region of the body, the temperature (50° to 110° F.) of the water and the force with which it is poured being regulated in accordance with the object of the treatment. The water may be continuously directed against some particular region, or changed from one part of the body to another, to suit individual requirements. The stimulating and thermic action of the water upon the skin brings about the desired reaction under ordinary circumstances when not more than from 5 to 10 pailfuls have been used.

The *fan* douche is a milder procedure and takes its name from the broad or fan-shaped stream which plays upon the body. It produces a moderate reaction and is especially suited to the treatment of nervous, old, and feeble persons suffering from constipation, enteroptosis, gastro-intestinal insufficiency, paresis, neuralgia, or neurasthenia. In this class of cases the streams of water are directed against the abdomen, nerve-centers, or the cutaneous or spinal areas indirectly associated with the gastro-intestinal tract.

The *filiform* (jet douche) consists in driving under strong pressure a very fine stream of water for several minutes against some particular spot or organ of the body. The jet douche is a powerful counter-irritant and stimulant, independently of the temperature of the water, and may be used to advantage in constipated individuals suffering from rheumatism, gout, sciatica, and paresis.

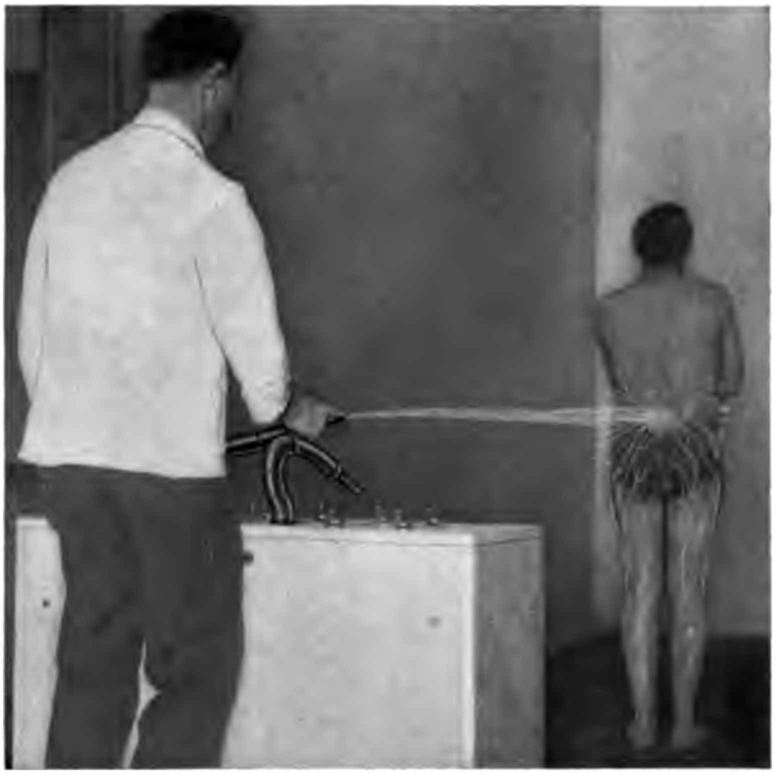

Fig. 115.—Spinal douche.

In the *massage* douche, the parts are persistently rubbed while the stream of water is directed against them. This hydrotherapeutic procedure is especially efficacious in the treatment of obstinate atonic costiveness, when applied to the liver, abdominal muscles, colon, or the dorsal and lumbar region of the spine.

Of the localized douches, the *spinal (lumbar*, Fig. 115), *hepatic* (Fig. 114), *epigastric, hypogastric, abdominal* (Fig. 113), *perineal*, and *anal* (Fig. 116) render the most efficient service in the treatment of both chronic habitual and spastic constipation.

Before discussing the therapeutic indications just named, I desire to call attention to one other, known as the *ascending* douche. Here the patient sits upon a bottomless chair or stool, while a cold or hot stream of water coming from below is made to play upon the anoperineal region (Fig. 116).

The cold ascending douche is indispensable in the presence of an atonic condition of the lower rectum, inflamed hemorrhoids, or chronic proctitis because of its tonic action; while the hot ascending douche is of great value in relieving pain, irritation, and sphincteric contraction due to protruding piles, fissure, ulceration, and other rectal affections.

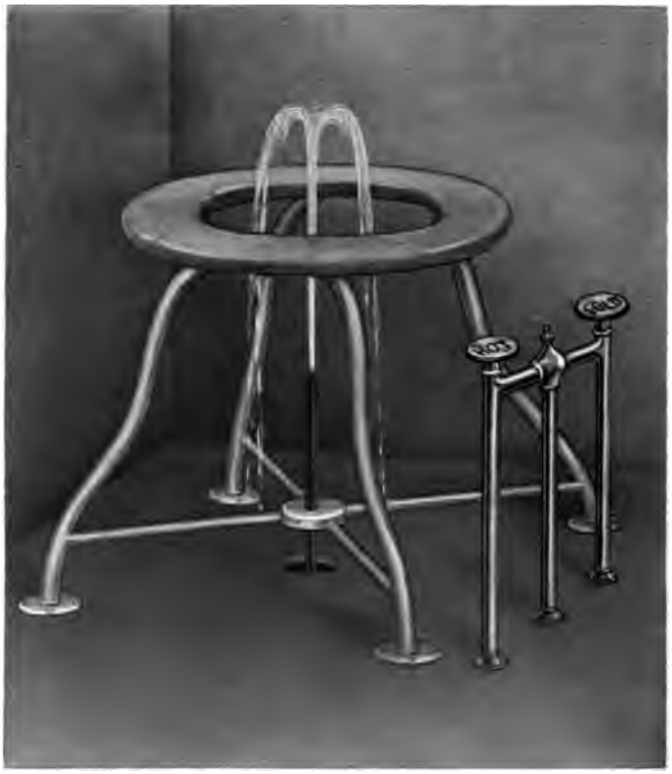

Fig. 116.—Author's anal (ascending) douche.

If the value of the ascending douche in the treatment of constipation and diseases of the rectum were more generally understood, it would be employed more frequently than it is at present.

Where a general tonic effect is indicated, *cold* douches are preferable, and should be given at a temperature varying in ordinary cases from 75° to 65° F., and in obstinate constipation from 60° to 50° F.; but when it is desirable to relieve enterospasm, allay irritation, and stop pain, hot (115° to 125° F.), neutral (92° to 98° F.), or tepid (70° to 80° F.) douches always give satisfaction.

Consequently, general or local cold douches are preferable in the treatment of atonic constipation associated with anemia, insomnia, melancholia, headaches, muddy complexion, manifestations arising from auto-intoxication (torpidity of the liver, loss of appetite, indigestion, malnutrition), and other symptoms indicating a generally run-down condition.

From what has already been said of hot douches, it will be inferred that they are indicated for the relief of spastic constipation, colic, abdominal and pelvic pains, spinal irritation, sphincteric contraction, and the discomfort and pain from anal fissure and hemorrhoids.

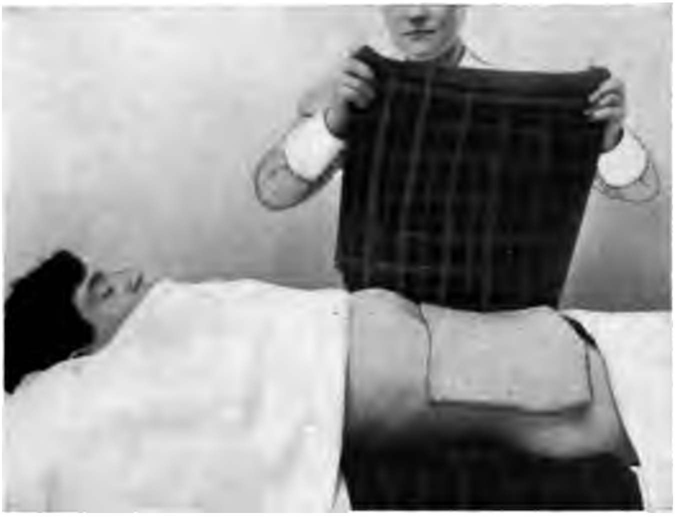

Fig. 117.—Method of applying hot fomentations.

The tonic effect of the cold douche can be augmented by preliminary heating of that part of the body to which it is to be applied, by using the water under strong pressure (percussion), by alternating the cold with hot water, and by sharp friction of the part treated immediately after the douche has been applied.

The pail (Fig. 112), fan, and rain douche (Fig. 111), directed locally over the lower part of the spine, the liver, the stomach, and intestine, day after day, for from five to fifteen minutes at a time, accomplish a great deal toward regulating the stools. I have witnessed the cure of many cases of obstinate constipation from this simple hydriatic procedure.

Constipated persons who also suffer from auto-intoxication and neurasthenia should take a Turkish, Russian, electric-light, or other sweating bath, and then follow this with the Scotch or cold douche and friction to obtain the best results.

Compresses, hot and cold (Figs. 117, 118), may be used at the same temperatures and for the same purposes as douches. They may be substituted for baths and douches in old and feeble patients and for persons under treatment for constipation who are unable to go to a bathing establishment or refuse to submit to the douche. The **cold girdle** (Fig. 118) or localized compress, placed over the digestive organs every four hours, strengthens and stimulates them to renewed activity.

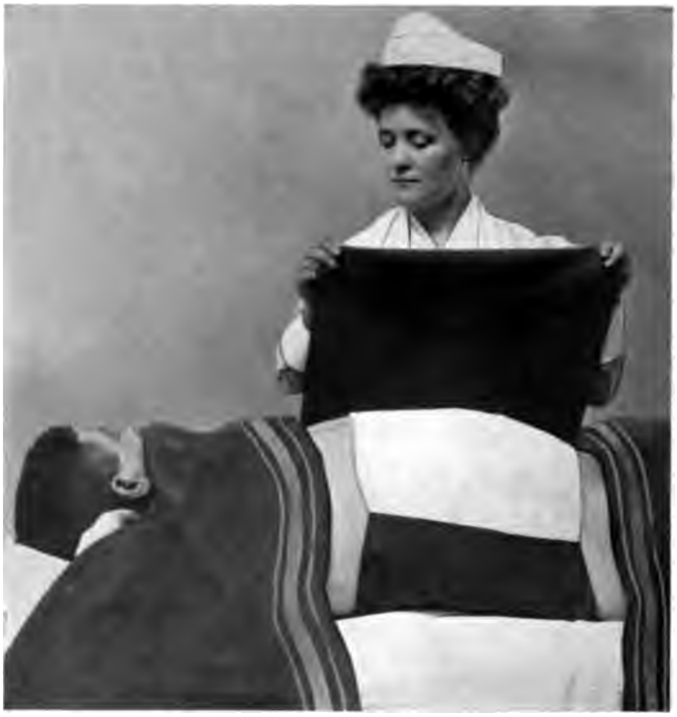

Fig. 118.—Cold abdominal or Neptune girdle.

I know of no more convenient and reliable way of relieving spastic constipation, lessening the pains of all forms of colic, and diminishing the muscular rigidity accompanying acute inflammatory conditions of the abdomen than by the application of **hot fomentations** (Fig. 117). To be most effective, hot fomentations should extend far beyond the borders of the painful or irritable area, be wrung dry (Fig. 119) to avoid blistering, be changed every five or ten minutes, and covered with rubber or any impermeable material which will retain the heat. One, two, or more layers of thick cloth, flannel, or felt make a satisfactory medium to carry the water.

When, in addition to heat, a counterirritant is desired, a small amount of mustard or turpentine may be added to the water used for the fomentations.

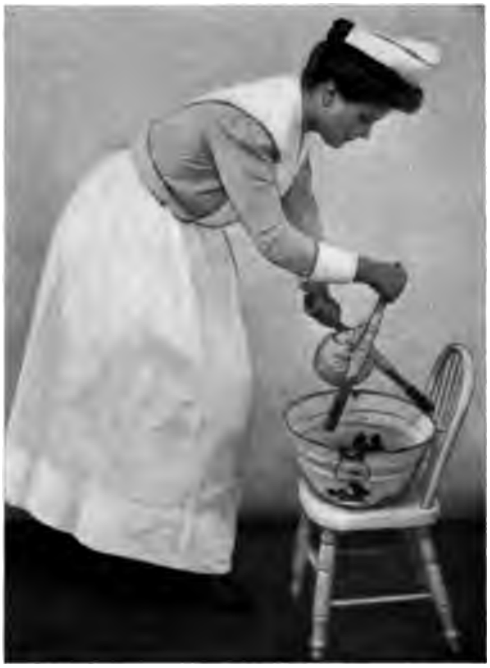

Fig. 119.—Simple method of wringing out hot fomentations.

A hot-water coil, hot-water bag, or hot-sand and salt-bags may, when occasion demands, be substituted for hot fomentations, and the ice-water coil (Fig. 120) may be used in place of the cold compress.

Packs.—When for any reason it is desirable, cold or hot wet sheet packs may be used in the place of baths, douches, and compresses to tone up the system or soothe an irritable bowel. The wet pack lends itself to a number of modifications by means of slight changes in the technic. This hydriatic procedure, which was originally described by Lucas (1750), requires careful and conscientious application, and, above all, a good understanding of the patient's reactive capacity. Its use is always contra-indicated in weakened individuals, especially in the presence of a feeble heart action.

In a general way it may be said that all hydriatic measures, in order to have a favorable effect upon chronic constipation and allied conditions, demand not only a careful technic, but a thorough knowledge of the principles governing their action.

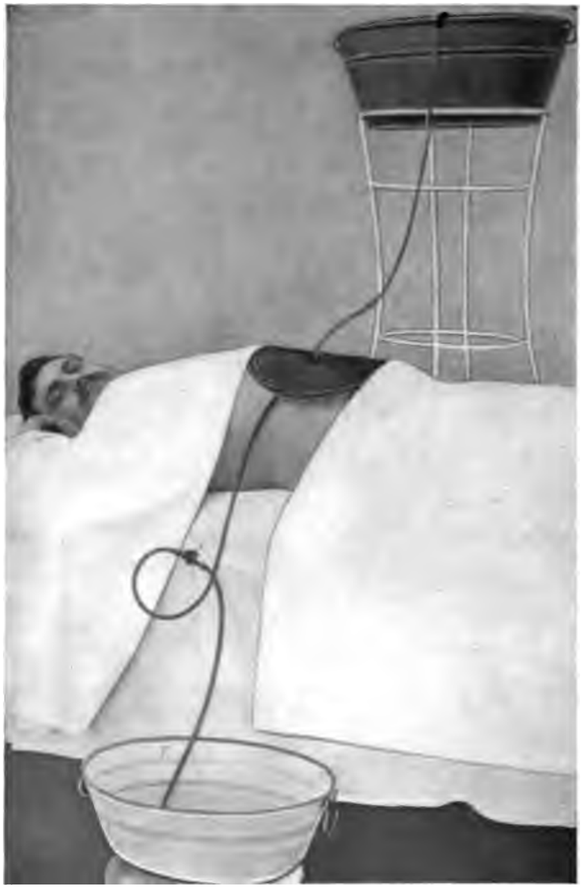

Fig. 120.—The ice coil in position.

CHAPTER XXIII

MASSAGE

General Remarks.—Massage systematically and persistently given constitutes one of the most valuable of all the physiologic therapeutic procedures which have thus far been suggested for the relief and cure of constipation and allied conditions—viz., auto-intoxication, headache, neurasthenia, anemia, indigestion, etc.

Massage may be successfully employed in this class of cases independently or in conjunction with other therapeutic procedures recommended for the cure of constipation. Formerly, massage in this country was in the hands of charlatans or "rubbers"; recently, however, this reliable therapeutic agent has been taken up by well-educated medical men and is now largely practised and controlled by them.

If physicians generally would acquaint themselves with the varied *uses* and *technic* of giving massage, they would employ it very much more frequently than they do now, and in consequence the so-called "Osteopath" would very soon disappear.

Massage *well done* is a reliable therapeutic procedure, while manipulations superficially or carelessly performed accomplish nothing and may do great harm; consequently, this weapon for good or evil should be placed only in the hands of those who understand its virtues and dangers, and know how to bring out the former and avoid the latter.

Unnecessary *flourishes, slaps,* and *bangs,* so frequently resorted to by *masseurs* for effect, are to be strongly condemned because they accomplish nothing, and serve only to make the subject unduly nervous, which interferes with the treatment because of the associated stiffening of the abdominal muscles.

Massage, to be successful, should be given daily and during a period of time extending over at least several weeks; consequently, when it is spasmodically resorted to from time to time, nothing is to be expected from it in the treatment of constipation.

Massage should not be *indiscriminately* used, hence it is not advisable to prescribe it until the cause of the trouble has been fully determined, and then only with a *definite* purpose in view.

The *force* to be employed in massage movements in the treatment of constipation should be regulated in accordance with the sensitiveness or nervousness of the patient, rigidity of the abdominal muscles, and the amount of fat contained within the abdominal walls. During the first treatments the manipulations should be light and of short duration; later, the amount of pressure and length of the séance may be gradually increased as the patient becomes accustomed to them and until he can endure without discomfort the deep and firm pressure movements for from fifteen minutes to half an hour or even longer.

Nervous or delicate persons frequently are frightened or discouraged and refuse to continue massage when they are roughly handled or exhausted by long-continued manipulations at the outset. Patients should never be recommended to uncouth or disagreeable *masseurs* or those having clumsy, rough, or uneducated hands, because these will do them no good, will aggravate their nervous state, and cause them much discomfort and pain. The expert *masseur* can comfortably and effectively massage a patient without the aid of *lubricants* upon the hands, hence vaselin, oils, cocoa-butter, powders (zinc stearate, etc.), and other ingredients should not be used, as a general rule, except when their medicinal effect is desired, for the reason that they interfere with the manipulations by making the parts too slippery.

Massage can be given more satisfactorily when the hands come in direct contact with the skin; because of this it is not advisable to give the treatments through any article of dress designed to avoid exposure of the person.

Technic.—In the treatment of chronic constipation the manipulations are confined principally to the abdomen, gastro-intestinal tract, liver, pancreas, and lumbosacral spine, except where the patient is in a run-down condition and requires general manipulations to tone him up. There are five characteristic massage movements which may be advantageously employed to enhance the activity of the intestine: (1) Effleurage; (2) petrissage; (3) friction; (4) tapotement; (5) vibration.

I shall not attempt a technical description of the above-named procedures, but will describe them as briefly and simply as I know how.

Effleurage is a mild and soothing form of massage, and consists in giving to the part treated a number of long, slow, and soft strokes, directed in such a manner as to carry the venous and lymph flow toward the centers. In order to obtain the best results and cause the least discomfort, the stroke should be *continuous*, that is, the fingers, hand, or fist, when they have reached the farthest end of the stroke, are made to glide quickly and gently back to the beginning without losing contact with the skin. The rapidity of the manipulations, the duration of the séance, and the amount of pressure employed are determined by the sensitiveness of the patient and the nature and obstinacy of the constipation.

Effleurage is the most suitable type of massage for constipated persons where the stomach, liver, and intestine are irritable, tender, or painful, and when it is desirable to bring about the absorption of exudates, also as a substitute for petrissage and tapotement, when stimulation of the bowel is needed in old, feeble, and sensitive persons, who either cannot or will not submit to the last-named manual movements on account of their severity. Under other circumstances effleurage is of little use in the treatment of *atonic* constipation. Because of the sedative effect of effleurage upon the tissues and nerves, these manipulations can be relied upon in *spastic* constipation to allay irritation and to relieve and prevent enterospasm. This form of massage, however, is most frequently employed as a preparatory measure prior to the heavier manipulations about to be described.

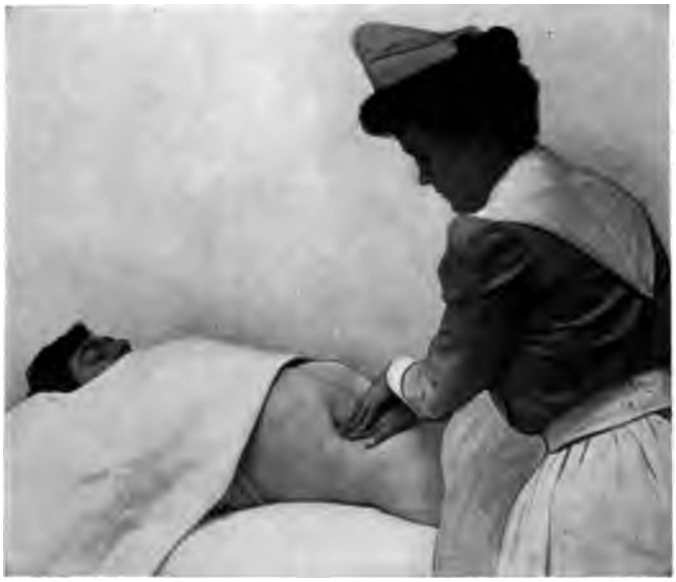

Fig. 121.—Pétrissage, or deep-pressure massage.

Pétrissage (Fig. 121), known as *pressure* massage, is the most reliable of all the manipulations to be discussed, in so far as they concern the treatment of constipation. Pétrissage has to do principally with the deeper muscles and contents of the abdominal cavity, hence a greater degree of pressure is required than for effleurage. When these heavier manipulations are resorted to in the treatment of costiveness, the *masseur* should be extremely careful in order to avoid injury to the liver, the stomach, or intestine.

In the pétrissage movements the muscles, intestine, and other structures manipulated are seized by deep hand-grasps and lifted upward and stripped, or they may be kneaded by alternately squeezing and relaxing the fingers or hands. All pressure movements, such as kneading, twisting, or rolling of the tissues, come within the scope of pétrissage.

Manipulations of this type improve the condition of constipated individuals by strengthening the abdominal muscles and making them more supple, decreasing the amount of fat, emptying the lymph-spaces, increasing the flow of bile, toning up the nervous and circulatory systems, augmenting the secretory function of the bowel, and stimulating the eliminatory apparatus to a more rapid and thorough removal of poisons and effete matter.

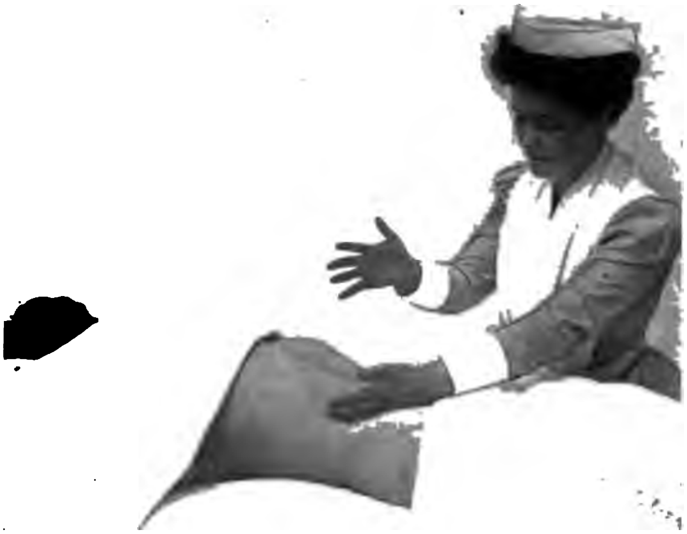

Fig. 122.—Tapotement massage, where the parts manipulated are repeatedly struck with the edge of the hand.

Friction is performed by placing the cushion of the thumb, the tips of the fingers, palm of the hand, or closed fist upon the skin over the part or organ to be massaged, and then rubbing in circles without changing the original relation between the hand and the integument; in other words, the skin under pressure is made to describe circles over the structures beneath it.

Friction is more useful than effleurage and may be employed in the same class of cases as pétrissage, but is not nearly so effective for increasing the activity of the bowel.

Tapotement (Fig. 122) by itself has but little value in the treatment of costiveness, but is of material assistance in securing more regular evacuations when employed in combination with pétrissage. Here the parts are sharply, quickly, and repeatedly struck with the tips of the fingers or edge of the hand, to irritate them and bring about a reaction which increases the circulation of the abdominal organs and stimulates the muscular contractions and glandular activity of the intestine, all of which contribute to improve the constipated state.

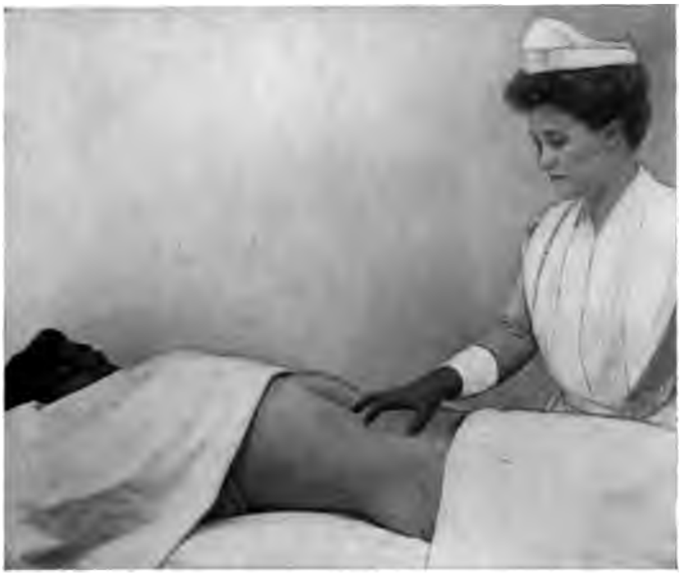

Fig. 123.—Hand vibratory massage.

Vibration is a reliable therapeutic agent, especially in the treatment of diseases of the digestive tract, but at the present time its merits are not fully appreciated in this country.

In carrying out this procedure, the fingers, heel of the hand, or fist are placed over the affected organ and held stationary or moved over it, while a shaking, wave-like, up-and-down, or side-to-side motion of the hand is instituted (Fig. 123). The pressure may be slight or heavy and must be regulated to meet the indications present. Hand vibratory movements of the liver and intestine are very effective and do a great deal toward correcting torpidity of the liver and overcoming sluggishness of the gastro-intestinal tract.

Abdominal Massage.—Massage of the abdomen is an important feature in the local treatment of atonic constipation, and includes the various manipulations which are employed to improve the condition of the liver, colon, rectum, and the abdominal muscles.

Patients undergoing their first treatment should be encouraged by being told that they will suffer but little if any discomfort if they will only relax themselves completely, in order that the manipulations may be carried out without hindrance. In the beginning the movements should be light and the séances of short duration, in order to avoid causing fatigue and soreness of the parts subsequent to the treatment.

It is essential to note every irregularity of the abdominal surface, swelling inside the cavity, or tender spots, and when in the course of

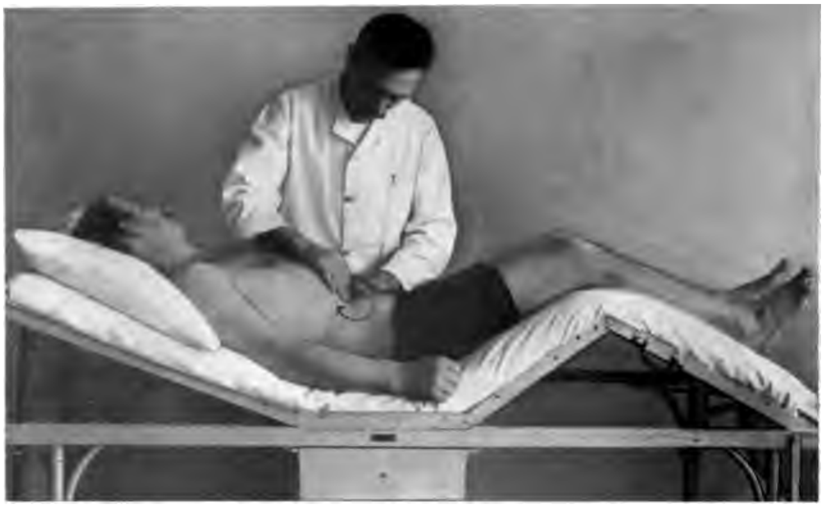

Fig. 124.—Patient upon a suitable table and in the proper position for deep rotating pressure massage.

a careful examination an acutely inflamed area or a tumor is discovered, this should be rigidly avoided during the treatment. Massage is necessarily contra-indicated in all inflammatory conditions of the abdominal viscera.

The best position in which to place a patient for abdominal massage is the recumbent or dorsal, with the shoulders and hips slightly raised and the knees flexed (Fig. 124). In order to work to the best advantage and avoid unnecessary fatigue, the masseur must be provided with a convenient massage table, of a suitable height. In most instances, relaxation of the abdominal muscles can be satisfactorily secured in this posture. Rigidity is usually the result of nervousness, and it is well to divert the patient's mind by talking to him on some indifferent topic. Should this maneuver fail, the desired relaxation is, as a rule, obtainable by requesting the patient to turn upon his side and draw his knees up until they are at a right angle with the body. Another plan which has been found useful for the securing of prompt muscular relaxation is carried out as follows: The patient straddles a chair, with the face turned toward the back and the elbows resting upon it, he is then requested to lean slightly forward while the manipulations are being made.

Massage can, of course, be given more effectively and with less inconvenience to the *masseur* with the patient flat upon his back than in either of the positions just described. Preferably, the *masseur* should stand on the left side of the patient when giving abdominal and colonic massage; this, however, is a matter of choice, and in many instances it will be found advantageous for him to change sides in order more successfully to manipulate all parts of the bowel.

Beginning on the right side, the *cecum*, the *ascending*, *transverse*, and *descending colons*, and the *sigmoid flexure* are in turn given *effleurage*, using slow and gentle strokes to quiet nervousness on the part of the patient and soothe the abdominal and intestinal musculature when it shows a tendency to contract. As soon as the patient has become accustomed to mild manipulations, the masseur should begin at the same point and follow in the same direction while he proceeds to strip or knead (petrissage) the colon from one end to the other. He should then again massage the different segments of the large bowel by successively rolling them between the fingers and hands, and, finally, when still further massage is required, *vibration* or *circular friction* movements should be applied to the cecum, colon, and sigmoid flexure.

In some instances it is an advantage to have the patient turn on one side while massage is being given on the other, in order that the small intestine may drop away, which permits deeper manipulations. When the abdomen is so fat, the mesentery so short, or the intestine so bound down by adhesions that the colon cannot be kneaded *directly*, it should be exercised *indirectly* through the abdominal wall by means of heavy pressure—*friction*, *vibration*, or both.

When the stomach is atonic it should be dealt with in a manner similar to that recommended for the relief of the same condition affecting the intestine. A liver engorged from excessive eating and wine drinking can often be reduced in size and excited to greater activity by means of *friction* and *vibration* carried to it by the finger-tips, heel of the hand, knuckles, or an upright cone formed by placing the fingers of one hand over the other.

At the same séance and in the same way the gall-bladder and bile-ducts can be manipulated, to empty the former of retained mucus and rid the latter of stringy mucus, biliary calculi, or anything which interferes with the free flow of the bile. The gall-bladder cannot be effectively reached by means of hand-grasps because of its protected position. The liver is a delicately constructed and easily injured organ, and because of this it must be manipulated most carefully under any and all circumstances.

Abdominal massage should not be given earlier than one hour after meals and never before the bladder has been completely emptied.

In obstinate atonic constipation, when the patient has been under treatment for a considerable time, the séance should last from twenty minutes to an hour, repeated at least once daily, and continued several weeks, months, or a year, or until the regularity of the stools is established and complicating manifestations have disappeared.

Cures of *intestinal obstruction* due to hernia, volvulus, and invagination of the intestine by means of massage have been recorded. Personally, I consider manipulation in this class of cases a most dangerous procedure. When ileus cannot be relieved by medication, copious hot-water drinking and hot enemata, reënforced by hot fomentations and change of position, the sooner the abdomen is opened and the cause of the trouble is ascertained and corrected, the better it will be for the patient.

In concluding my remarks upon the technic of abdominal and gastro-intestinal massage, I must say that I know of no other affection which responds more readily and effectively to massage than does chronic constipation and its concomitant manifestations.

Physiologic and Other Effects of Massage.—Massage, through stimulation of the skin and deeper structures, brings about a decided *reaction*, which is followed by a temporary increase in the flow of blood, the amount of hemoglobin, and the number of red blood-corpuscles. Again, it strengthens and retardates the pulse, stimulates the body metabolism, promotes secretion and absorption, improves the nervous functions, strengthens the musculature, and in a general way tends to the upbuilding of health and the reëstablishment of more regular evacuations from the bowel.

Judicious massage assists through many different routes in overcoming constipation and in removing its numerous sequelæ. I have not the space to do more than to give the following brief résumé, which includes the more important of the different ways by which massage influences and controls the constipated state:

1. It strengthens the contractile power of the muscular fibers in the intestine and abdominal muscles and augments peristalsis.

2. It stimulates the intestinal glands to secrete a better supply of mucus to lubricate the bowel.

3. It arouses the nervous system to a more healthy activity.

4. It augments the arterial, venous, and lymphatic circulation, thereby facilitating absorption, assimilation, and oxygenation.

5. It increases biliary secretion and clears the gall-bladder and ducts of mucus and other obstructive substances.

6. It relieves or prevents intestinal auto-intoxication by improving the functional capacity of the skin, the liver, the kidneys, and the intestine.

7. It helps to break up adhesions and promotes the absorption of exudates following appendicitis, peritonitis, and other acute inflammatory processes, which interfere with the action of the bowel.

8. It dislodges and pushes downward small scybala and large putty-like fecal accumulations lodged in any part of the colon.

9. It diminishes flatulence and consequent distention of the bowel, and, lightly applied, relieves colic by driving the gases downward into the rectum, whence they are readily expelled.

10. It favors the dislodgment and evacuation of enteroliths and other foreign bodies causing obstruction.

11. It softens the feces by promoting admixture with the pancreatic and biliary fluids, and increasing intestinal glandular secretion.

12. It assists in driving the contents of the small bowel into the cecum when the ileocecal valve obstructs their passage, and helps to force the solid feces out of the sigmoid flexure through O'Beirne's sphincter into the rectum, when the evacuations are delayed through spasmodic sphincteric contraction.

13. It overcomes atony of the colon and rectum and relieves spasmodic contraction of the anal sphincter.

14. It relieves or cures *spastic constipation* (enterospasm), provided the manipulations (friction) are gently given.

15. It breaks up fecal masses and assists them to pass points of obstruction in cases of *mechanical constipation* (from angulation, volvulus, adhesions, etc.) or obstipation.

Finally, massage makes the patient feel that something definite is being done to cure him, and it imparts to him a sense of buoyancy, improves his appetite and digestion, at once exhilarates and soothes his nerves, allays headache and sensations of fatigue, promotes sleep, and in many other ways serves to raise the general health of these constipated patients to a higher level.

The local and general results following massage in this class of cases are even more marked when the treatment is combined with hydrotherapy, more particularly when the *friction* is *preceded* by a sweat bath and followed by a cold fan, pail, percussion, or Scotch douche, and then a brisk rub down with a coarse towel. Not infrequently it is advantageous to prescribe massage in conjunction with the Weir-Mitchell treatment (rest-cure).

The benefits derived from this form of treatment are astonishing and often manifest themselves at once after the reaction.

The contra-indications to massage, briefly stated, are menstruation, pregnancy, feebleness, fevers, floating kidney, tumors, aneurisms, tender spots, intestinal obstruction, gastric and intestinal ulcers, abscess, appendicitis, peritonitis and other acute inflammatory processes, atheroma, hypersensitiveness, senility, certain cases of hysteria, and the great majority of skin diseases.

CHAPTER XXIV

MECHANICAL VIBRATION

In the preceding chapter I have discussed Massage and Manual Vibration, and will now briefly consider the therapeutic value of *mechanical vibration*, in so far as it pertains to the treatment of chronic constipation, as accomplished by the different types of vibrators (Figs. 125, 126).

This latter procedure has come quickly into popular favor, and deservedly so, because it is a form of treatment the technic of which is easily learned, can be applied in the office, hospital, or at the home of the patient, and does a great deal toward establishing the regularity of the stools.

My experience with mechanical vibration during the past five years has been most satisfactory, and I consider it a valuable addition to our armamentarium in the treatment of this class of cases. In some instances a cure can be effected by it alone, provided it is properly administered and persisted in for a sufficient length of time; but, as a rule, it must be employed in conjunction with other therapeutic measures in order to secure lasting results.

During the last few years many different instruments have been devised for the purpose of giving mechanical vibration, some of which have been found useful, whereas others have proved worthless. Vibrators may be propelled by electricity, water, compressed air, or carbonic acid gas. Some models are convenient to use, while others are unhandy. Personally, I prefer instruments having a rigid arm with movable joints to those with a flexible shaft, because I have found them more durable and easy to control.

Vibratodes (Figs. 125, 127) are made of metal, wood, hard and soft rubber, come in different lengths, and vary as to size and shape.

To meet the indications in the various cases it is necessary to have vibrators which communicate to the vibratodes an up-and-down rotatory and lateral movement, in order to make the impulse penetrate deeply or travel along the nerve in either a central or peripheral direction. Every vibrator should be constructed in such a way that the speed and length of the vibratory stroke may be readily decreased or increased at the will of the operator.

Four things are essential to the successful treatment of constipation by means of mechanical vibration: (*a*) A thorough knowledge of the anatomy of the spinal and sympathetic nerves and their centers; (*b*)

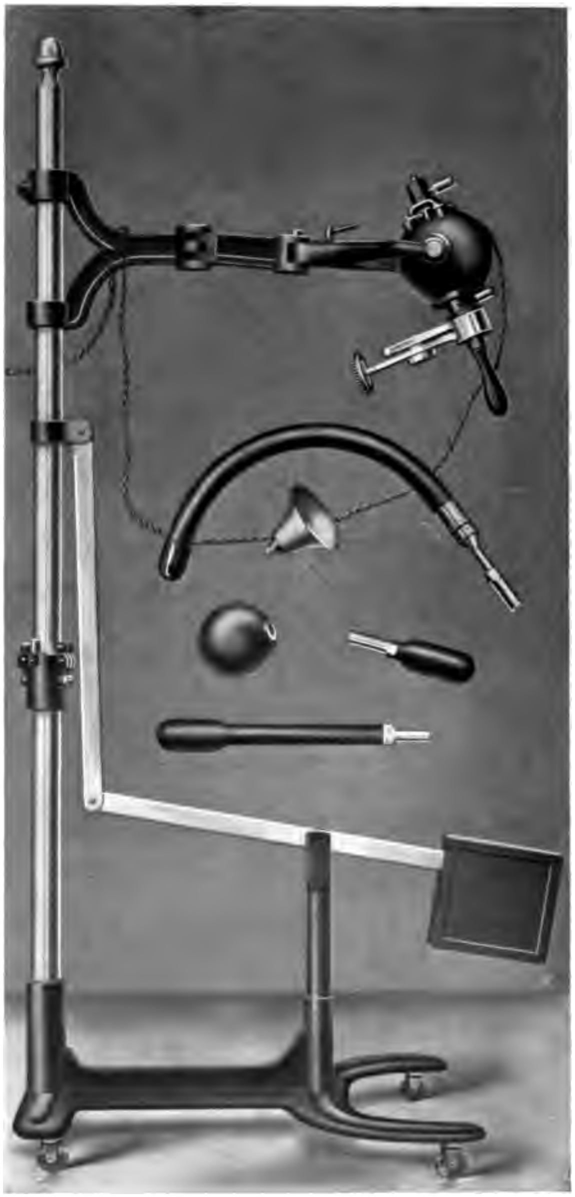

Fig. 125.—Chattanooga vibrator and vibratodes.

a careful diagnosis; (*c*) a perfected technic of the vibratory treatment, and (*d*) familiarity with the vibrator used.

Mechanical vibration should not be administered sooner than one hour after meals, and when it is to be applied to the abdomen the patient should first be requested to empty the bladder. It is both inconvenient and impracticable to attempt giving mechanical vibration before the clothing has been removed, so that the vibratode may come in direct contact with the skin. Lubricants should not be employed upon the instrument nor the integument, because the grease makes the part slippery and the applications more difficult. When the skin is dry and the vibrator moves over it with difficulty, this can be overcome by dusting the parts with stearate of zinc or talcum powder.

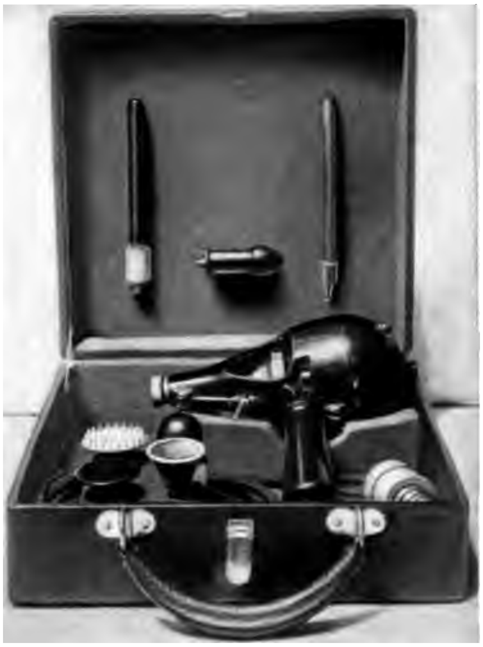

Fig. 126.—Sheldon portable vibrator.

During vibratory treatments the vibrations may be *continuous* or *interrupted*, the vibratode may be held stationary (*stabile*) or moved about (*labile*), and the applications may or may not be reënforced by pressure with the hand guiding the instrument.

Vibratory *massage* may be given by gently *stroking* the parts with the vibratode, by making deep pressure and *rolling* them between it and the hand, and by *friction*, when the vibratode is made to describe circles over the course of the colon or other part under treatment.

The nerves and nerve-centers are more effectively reached and roused by mechanical vibration than by any other form of stimulation thus far suggested. The local and far-reaching effects of this method of treatment are attributable mainly to the influence of the vibrations upon the spinal and sympathetic nervous systems, and the results obtained are either *sedative*, *stimulative*, or *inhibitive*, in accordance with the nature of the treatment. As a general rule, where the strokes of the vibratode are *light* and *short*, brief applications produce at first a *soothing*, and later, a *stimulating* effect, while the long-continued heavy strokes, through tiring or benumbing the nerves, have an inhibitory effect. The tendency of the novice is to make the treatments too violent and to continue them for too long a time in his efforts to obtain quick results, and in so doing he aggravates instead of improves the condition of his patient.

General and Physiologic Effects.—The reactionary benefits following mechanical vibratory stimulation are obtained in less time, are more pronounced in character, and appear to be more permanent than those which follow massage or manual vibration.

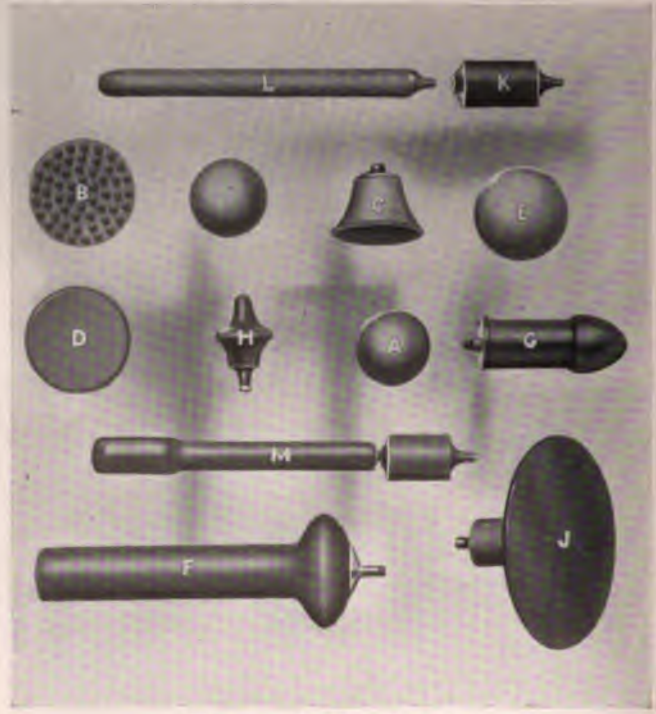

Fig. 127.—Sheldon vibratodes.

The effect of mechanical vibration, through its action directly upon the terminal nerve-filaments and indirectly upon the nerve-centers, profoundly influences the functions of the various structures throughout the body when the applications are general; or the influence may be limited to a single organ or part when the treatment is applied to its controlling nerve or nerves. By this means the blood-pressure can be raised or lowered, the pulse regulated or accelerated, and the blood-supply of anemic organs be materially increased; or, on the other hand, in the presence of congestion, the excess of blood can be rapidly diminished by changing the type of vibratode.

From this it may be inferred that mechanical vibration properly administered is a powerful agent for good, but when it is ignorantly or indiscriminately practised, much harm may result from its use.

Mechanical vibratory stimulation appears to strengthen the various functions of the nerves, and in so doing improves nutrition, secretion, and excretion. It possesses the advantage that it can be made to benefit directly the liver, stomach, intestine, or other organ or structure which is not doing its work properly.

In intestinal auto-intoxication the condition of the patient can be rapidly improved through direct vibratory stimulation applied to the lymphatic glands, skin, kidneys, liver, spleen, and intestine. Through vibratory treatment the efficiency of the abdominal muscles and the intestinal musculature can be decidedly increased, which enables the constipated patient to evacuate the bowel more regularly. This form of stimulation, in addition, serves to increase the peristaltic movements of the bowel, the secretion of mucus by the intestinal glands, and the flow of bile, where there is a torpid liver, and it breaks up and dislodges fecal impactions.

Mechanical vibration is also very helpful in loosening adhesions, promotes the absorption of exudates, and when lightly applied relieves irritation, hyperesthesia, deep-seated pain, and intestinal spasms in spastic constipation. Finally, mechanical vibratory treatment, when intelligently practised for a sufficient length of time, improves the appetite and the digestive process, favors sound and refreshing sleep, diminishes nervousness and attacks of headache, regulates the bowel, and tones up the general system.

The **technic** of mechanical vibration is not too difficult to be acquired in a short time by the careful and intelligent observer.

Except in persons who are run down and need stimulation of the *spinal* and *splanchnic* centers and the *solar plexus*, for the general tonic effect, vibratory treatment, in so far as it relates to the treatment of constipation, is confined chiefly to the stomach, liver, spleen, pancreas, colon, and rectum.

A *routine* method of applying mechanical vibration is inadvisable, on account of the varied conditions met with in a large series of cases. The *position* of the patient during the treatment must be changed from time to time, in order that the vibratode may be more effectively directed against the organ or part of the body requiring the treatment.

When the *abdomen* and *viscera* are to be vibrated, the *recumbent posture*, with the head and hips slightly raised and the knees flexed, is preferable, because it favors relaxation of the abdominal muscles;

but at times it may be necessary to turn the patient on one side while the deeper parts of the other side are being exercised.

When the *anus*, *rectum*, and *sigmoid* are to be treated, the *left* or *right Sims'* or the knee-chest posture will prove most convenient and satisfactory.

For *spinal* vibration, the most comfortable position for both patient and operator is for the former to lie *flat upon the abdomen*, with the head turned to one side (Fig. 128).

Mechanical vibration, administered to the *stomach*, *liver*, *spleen*, and *pancreas*, should be very light at first, and the speed and length of the strokes should be gradually increased as the parts become accustomed to the movements of the instrument.

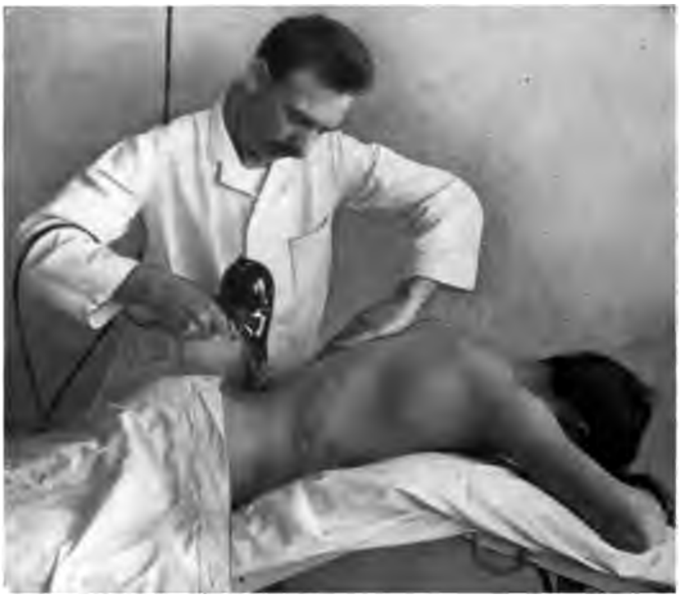

Fig. 128.—Correct method of applying mechanical vibration to the spine.

I believe it is unnecessary and, moreover, inadvisable to reënforce the vibrations with *pressure* while treating these organs, because it does not add to the efficiency of the treatment and may do considerable harm.

In atonic constipation the large bowel is principally at fault, and requires systematic and persistent stimulation and exercise for a considerable time before it will respond in a decided way to mechanical vibration.

In applying mechanical vibration to the *colon* the many-pointed rubber-brush ball (Fig. 129) or flat disc vibratode is selected and the machine is adjusted to the short stroke. Beginning on the right side, the cecum, ascending colon, transverse colon, and sigmoid flexure, in the order named, are gone over by lightly stroking the abdomen several times over the course of the large bowel. The speed and length of the strokes are then increased, when the bowel is again vibrated, the vibratode being first held stationary (stabile) for a short time and then moved onward (labile), from right to left, and step by step, until the different portions of the bowel have been exercised. With the same speed and stroke this route is again covered by *friction*, that is, the vibratode is made to describe frequent small circles as the operator progresses. Finally, in very obstinate atonic constipation, and after the patient has become accustomed to vibratory treatment, the different parts of the colon are subjected to vibration with the instrument adjusted to the long stroke, reënforced by as much pressure as may be advisable.

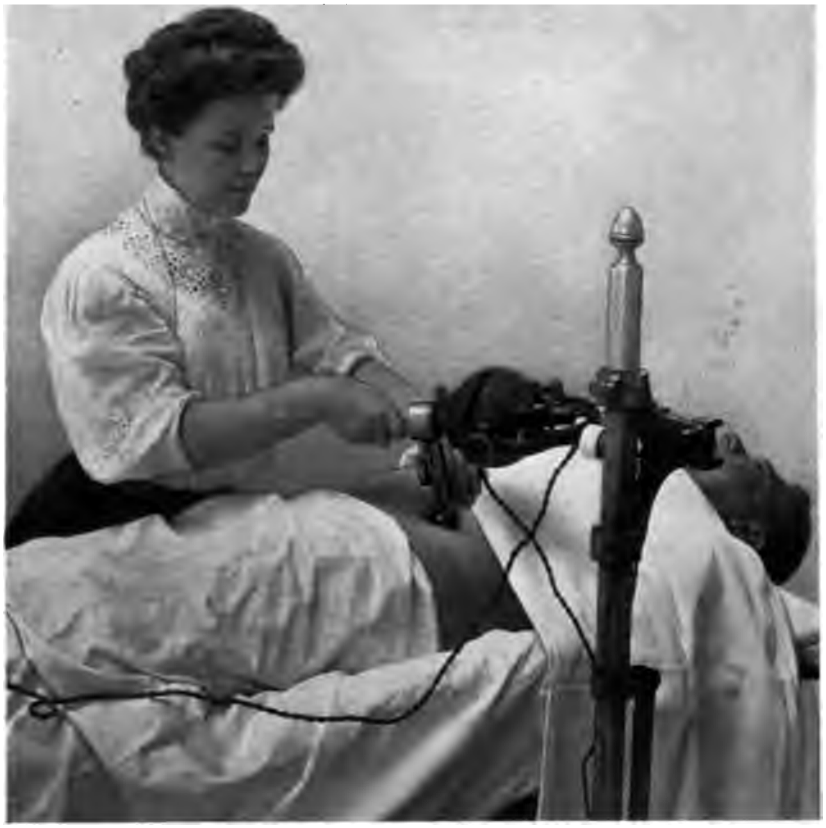

Fig. 129.—Method of using the Chattanooga vibrator when applied to the abdominal muscles and colon.

The number of times the bowel is gone over in the different ways described depends upon the severity of the case, the sensibility of the patient, and the readiness with which the intestine responds to the stimulation.

When the anus is small and there is atony of the rectum or contraction of O'Beirne's sphincter, a short or long soft, flexible rubber vibratode should be inserted into the rectum or the sigmoid flexure and the parts vibrated from three to five minutes, using the short stroke. Rigid vibratodes and the long stroke should never be used for this purpose, for the reason that they cause much pain and irritate the mucosa, prostate, bladder, and female genital organs, and aggravate any disease of the lower rectum which may be present. A small percentage of constipated individuals are permanently relieved of constipation by means of mechanical vibration judiciously applied to the regions just named.

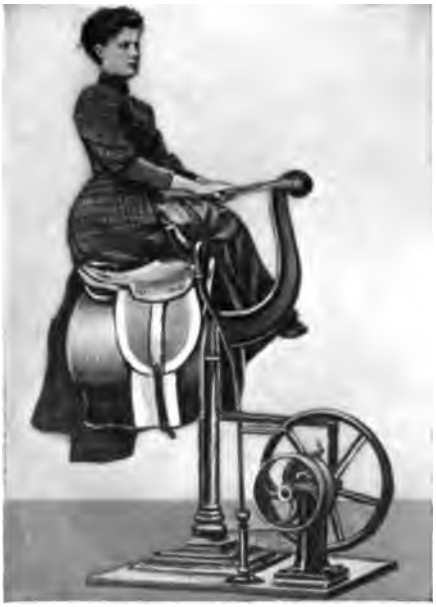

Fig. 130.—The "horse" (Zander machine vibration).

In many instances the constipated state can be very greatly improved through the aid of mechanical vibration (by means of the ball vibratode) applied directly to the spinal *centers* located in the dorsal, lumbar, and sacral regions, which exert a profound influence upon the functions of the liver, different parts of the gastro-intestinal tract, and the act of defecation. When these centers are at fault, they can be detected on pressure as sensitive spots on the sides of the vertebral column. Vibratory treatment to the spine should be applied with a soft-ball vibratode for a very brief period, and with light and short strokes, in order to avoid injuring the patient and disturbing his nervous equilibrium.

Spinal vibration should under no circumstances be continued for more than a few seconds at any one spot, nor should vibratory applications be made to the abdominal muscles, liver, and colon for more than from ten to fifteen minutes at a time; but when general stimulation is indicated, the treatments to the various parts of the body may extend over a period of time varying from twenty to thirty minutes. Light and short vibratory strokes are preferable in the treatment of superficial structures, and the long strokes, augmented by pressure, are indicated for applications designed for the relief of organs situated deeply in the abdominal cavity. The former can be safely continued for a longer time than the latter. Under no conditions should a cold vibratode be applied to the skin.

Vibratory treatment is contra-indicated in constipated persons suffering from anal fissure, inflamed and ulcerated hemorrhoids, ulcers, carcinoma, stricture, or acute catarrh of the rectum and colon, and in those who express an antipathy to this procedure.

Machine Massage, Vibration, and Exercise.—Zander (Stockholm) and Taylor (New York) have designed machines by the aid of which the various structures and organs of the body can be massaged, vibrated, or exercised. Two of the Zander machines, the "horse" (Fig. 130) and the "abdominal roller" (Fig. 131), are very effective in stimulating peristalsis and hurrying the evacuation of the feces. The former imitates very well the exercise derived from horseback-riding, while the latter shakes and massages the bowel as it encircles the course of the colon. One can form no idea of the pronounced stimulating effect produced upon the muscles and organs by exercise of this kind until it has been given a fair trial.

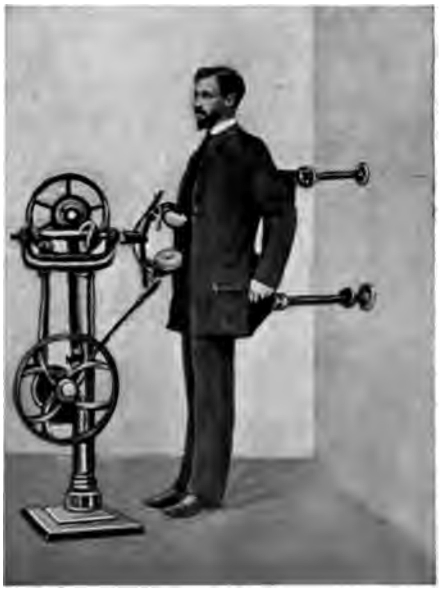

Fig. 131.—Abdominal massage (machine vibration).

The intensity and effectiveness of the treatments can be regulated by adjusting the machinery, and taking into consideration the resistance of the patient.

Machine massage and vibration frequently give temporary relief to constipated individuals, and in some instances a permanent cure is obtained, but, as a rule, the results following this procedure are not so lasting as those obtained by hand massage.

CHAPTER XXV

ELECTRICITY AND OTHER PHYSICAL THERAPEUTIC PROCEDURES

General Remarks.—Electricity is a therapeutic agent of value in the treatment of all varieties of constipation, but in my experience it has not proved so reliable as massage or mechanical vibration. Formerly there was some doubt as to the usefulness of this procedure in correcting costiveness, but at the present writing electrotherapeutists in general concede that nearly all forms of electricity are a valuable aid in overcoming sluggishness of the bowel.

The permanent relief of this complaint in the manner indicated usually requires weeks or months, and in order to shorten the duration of the treatment it has been my custom to correct errors in diet and to prescribe water drinking and baths in combination with the electric applications.

In a number of instances where none but electric procedures were employed, I have known them to cause an immediate evacuation following the treatment and also to effect a permanent cure.

Electricity is of service in the handling of nearly all constipated subjects when used in combination with other measures, but when employed as an independent procedure it will fail to give permanent relief in a large percentage of cases. Another advantage of electricity is that it frequently appeals to the patient, makes him feel that something definite is being done, and enables the attendant to manage him while the other necessary steps to effect a cure are being carried out.

Electric applications can be given at any hour, but the most suitable time for treating nervous individuals and poor sleepers is at night, just before bed-time. The various currents do much good when judiciously applied, but their indiscriminate use in the hands of the ignorant results in increased nervousness, soreness, fatigue, and other aggravations of the patient's condition. In order to accomplish the best results and avoid hurting or frightening the patient, the current must not be too strong at first nor too suddenly interrupted, and uncovered wires must not be permitted to come in contact with him.

For patients new to the treatment, the very young and the very old, sensitive individuals, and persons with an antipathy against electricity, the applications should be short, some distance apart, and the strength of the current gradually increased. Under other circumstances the strength of the current, duration, and frequency of the séances should be regulated according to the reaction they produce. When one type of electricity irritates the patient or fails, after a fair trial, to improve his condition, some other current should be chosen, or the electric treatment should be discarded in favor of massage, hydrotherapy, or mechanical vibration.

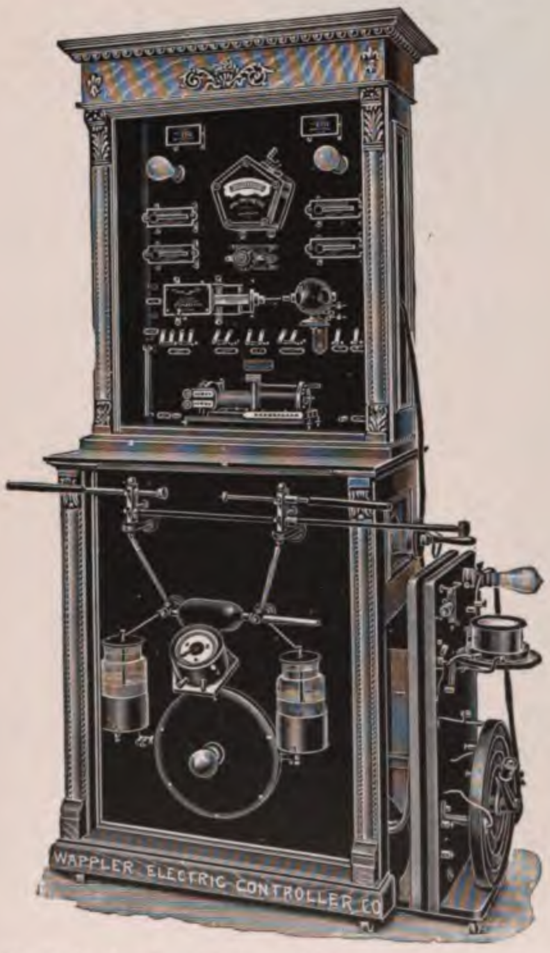

Fig. 132.—Author's electric cabinet, combining in neat and compact form the various types of electricity (galvanic, faradic, sinusoidal, high frequency) and the x-ray; at the same time providing power for illuminating purposes and the electric cautery.

It must be borne in mind, however, that the success of the applications depends quite as much upon the diagnosis and the technical skill of the operator as it does upon the current used. Some physicians evidently believe that the handling of electricity is a simple matter, and they permit their patients to treat themselves at home; this, I believe, to be a pernicious practice, and one which, for obvious reasons, should be condemned.

The following electric currents, which have been employed with more or less success in relieving constipation and its accompanying symptoms, are combined in convenient form—with the exception of a single one (static)—in the electric cabinet specially devised by the author (Fig. 132):

1. Faradic.
2. Sinusoidal.
3. Galvanofaradic.
4. Galvanic.
5. Static.
6. Static induction (Morton).
7. High frequency.

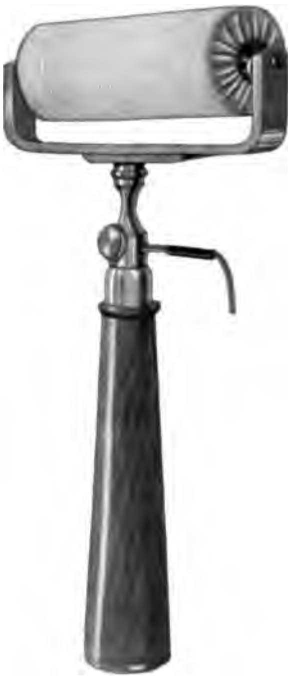

Fig. 133.—Electric massage roller.

Electric applications may be *percutaneous* (external), where both electrodes remain in contact with the surface of the body, or *internal*, where one is applied to the skin and the other is inserted into the bowel; they are said to be ***unipolar*** when the poles are widely separated, and ***bipolar*** when both electrodes remain near each other and on or over the organ or part of the body treated.

The dry skin is a poor conductor and a cold electrode causes discomfort to the patient. To overcome these difficulties, it is necessary to dip the electrodes in warm or hot water before the treatment is begun. For hygienic purposes, it is advisable, after each application, to re-cover the electrode with gauze, cotton, or other clean material of a similar kind. The patient should be partly undressed during the administration of all the forms of electricity except the static, which may at times be effectively given through the clothing.

Faradic, sinusoidal, and galvanic electricity may be applied *externally* by means of small or large flat electrodes (Figs. 136, 137, 139) or electric rollers (Fig. 133); or *internally*, by means of short and long rubber or metallic (Fig. 134) irrigating electrodes (Fig. 135); the static induction and high-frequency currents, by means of the ball, glass, rectal, and other electrodes devised for treating the abdominal organs and lower bowel.

Physiologic and Other Effects of Electricity.—Electric currents, according to the manner of application, can be made to influence all parts of the body or local organs, such as the stomach, liver, or intestine. When the patient is debilitated and nervous he requires general electrization, but when he is being treated for constipation alone, the applications are directed to the organs named above and to the cerebro-spinal and sympathetic nerve-centers which, to a certain extent, control them.

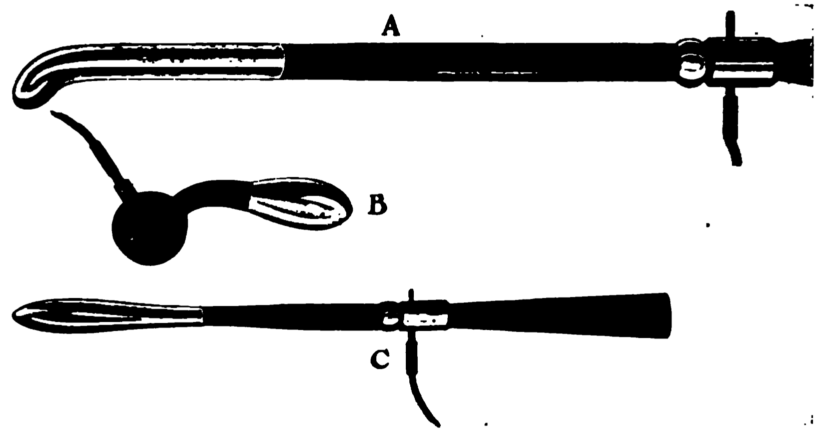

Fig. 134.—Electrodes: A, Colonic; B, rectal; C, anal.

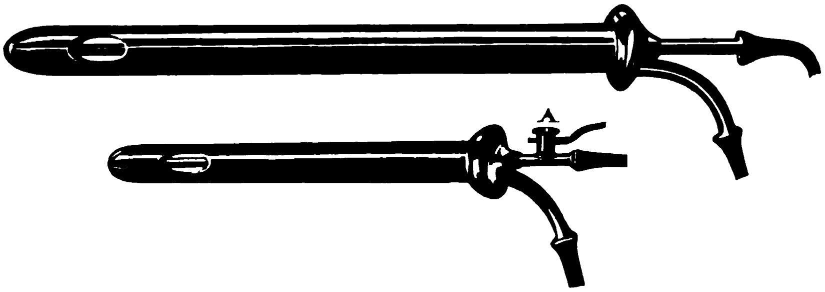

Fig. 135.—Kemp's rectal irrigator: A, Electric attachment for electro-enteroclysis.

When judiciously applied, the various electric currents previously alluded to have a tonic effect upon the nerves, blood-vessels, and muscles, in consequence of which secretion, absorption, excretion, oxygenation, muscular contractility, reflex action, and the body metabolism are favorably influenced and the general nutrition is improved.

My experience with electricity has led me to believe that the amount of mucus secreted by the colon can be increased by *external* (percutaneous) and by *internal* applications of electricity over the colon and to the mucosa directly, by means of a rectal electrode.

I have made macroscopic examinations of the stools of constipated individuals both before and after the electric treatments were begun, and on several occasions the evacuations were observed to be softer and to contain more mucus after the applications were started than before. Experimentators have demonstrated that electric currents applied to the nose and to the stomach will increase the flow of mucus in the former and the amount of gastric juice in the latter. I have apparently been able to increase the mucoid secretions in the colon and the rectum by introducing the electrode into the bowel through colostomy openings and the anus. If I am not mistaken in my premises, I am justified in concluding that the more frequent evacuations which follow electric treatments are due, at least in part, to the increased fluidity of the feces and better lubrication of the bowel resulting from the more abundant flow of mucus.

Electricity also acts favorably, both upon the *voluntary* muscles of the abdomen and upon the *involuntary* musculature of the intestine, increasing the expulsive power of the former and the contractility of the latter, conditions which greatly facilitate the movement of feces along the colon and their final expulsion from the rectum.

Faradic, galvanic, or sinusoidal currents applied to the abdominal muscles cause them to contract, the effect being increased by *interruption* of the current, as illustrated in the bowel of a living frog or rabbit, where the intestinal musculature may be seen to contract at the points of contact with one or both poles.

I have been able to excite contraction of the human intestine by applying electricity to the peritoneal surface of the gut during operations, and to the mucosa of the upper colon and rectum through colostomy openings and by rectal applications, and I have observed that the contractions were more decided when the applications were made to the outside than to the inside of the bowel, a difference due in all probability to the fact that the mucosa is a poor conductor or that its nerves respond less readily to electric stimulation. Boas (Berlin) and others have observed peristalsis set up in immediate response to percutaneous faradization over the colon in persons having thin abdominal walls.

I have made similar observations, and on other occasions have felt with the hand intestinal activity beginning shortly after the application of the current to the abdomen. On many occasions I have known electric treatments to induce a desire to stool, followed by copious evacuation, in obstinately constipated persons, who had no inclination to go to the toilet before the applications were begun.

The favorable results thus obtained I have been accustomed to attribute to the effect of the current in exciting peristalsis, its influence upon the mind of the patient, and the added stimulation of the bowel referable to the presence of the electrode in the rectum.

The mere introduction of large bougies into the bowel frequently serves to excite an evacuation because of the resulting mechanical irritation. The permanent recoveries which have been observed to follow the electric treatment of persons suffering from constipation associated with flabby abdominal muscles and colonic atony, lend support to the belief that this therapeutic procedure does strengthen the muscular fibers of both the intestine and the abdominal wall.

The faradic and the Morton induction currents, when applied to the liver, slightly increase the biliary flow through their action upon the circulation and nerves. Consequently, electricity assists in this additional way in relieving costiveness through the well-known purgative action of the bile.

I will now briefly discuss the manner of employing the different currents, and point out their special indications, in so far as they relate to the handling of constipation.

Faradic Electricity.—The faradic current is the most useful form of electricity which can be employed in the treatment of constipation. This current is constantly undergoing *interruptions*, and the *mechanical stimulation* excited thereby directly and indirectly influences the nervous, muscular, and glandular structures connected with the gastro-intestinal tract, in consequence of which the abdominal circulation is improved, the bowel is strengthened, peristalsis is augmented, the secretion of mucus is increased—all these factors tending to promote more regular and complete evacuations.

When necessary, in obstinate cases, faradization can be made more effective by increasing the current and by breaking it at short intervals (Fig. 136). Except in very nervous or hypersensitive patients, or in those having an antipathy against electricity, the strength of the current, may be gradually increased to the point of tolerance.

For the relief of hepatic torpidity, dilatation of the stomach or bowel, and atony of the colon the application may be made directly over these organs to the spinal centers which control them and also the act of defecation; or directly to the inner surface of the gut by means of the rectal electrode.

Faradic electricity is easy to control and apply in so far as it relates to the treatment of costiveness, but must be used systematically and persistently in order to obtain the best results. When the abdominal muscles, the liver, the stomach, and the large bowel are to undergo faradization, the positive, or weaker pole, is connected with a broad electrode, which is permitted to rest against the spine, while the stronger negative pole is connected with a small electrode, which can be held stationary (stabile) or moved about (labile) over the parts during the treatment. Except when contra-indications are present, the steps in the treatment are as follows: With the patient in the recumbent posture, with head and hips slightly elevated to relax the abdominal muscles, the negative electrode is pressed deeply down over the cecum and held there for a brief period, after which the ascending, transverse, and descending colon, and the sigmoid flexure are each in turn subjected in like manner to continuous faradization. After a brief rest, the different portions of the large bowel are again gone over slowly, while the application is being frequently *interrupted* by the current breaker, or by lifting the electrode, in order to excite a more marked degree of contraction. The bowel is then again treated, *friction* being added by making the electrode continuously describe small circles as it passes over different parts of the gut, first with the continuous, and then with an interrupted, current. After the procedures described have been

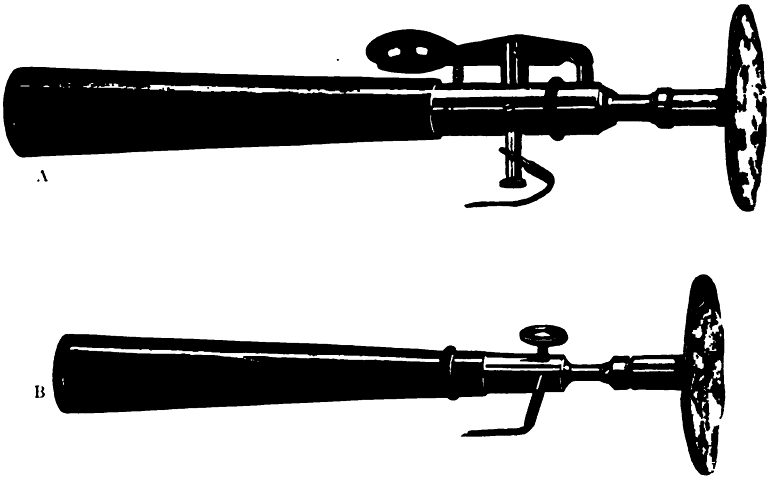

Fig. 136.—A, Electrode with interruptor for galvanic, faradic, and sinusoidal currents; B, ordinary (continuous) electrode used for different currents.

repeated several times, the abdominal muscles, liver, and stomach are submitted to faradization in a similar manner. The treatment is then completed by connecting a metallic or irrigating electrode with the negative pole, and introducing it into the rectum or colon, where it is allowed to remain for several minutes, while the positive pole is applied to the abdomen or spine.

Except in those cases where the electricity is being administered to relieve atony of the rectum, flexible irrigating electrodes of the Boas (Fig. 138) or Ewald type are preferable to the rigid metallic electrodes, because they can be introduced with greater ease, do less harm, and permit the bowel to be filled with water, which acts as an electrode and carries the current to all parts of the colon. The water, aside from its thermic action, is of no assistance except in so far as it acts as a conductor and extends the field of the electric treatment.

I prefer a normal saline solution, 1 or 2 quarts of which is allowed to run slowly through the tube after the current has been turned on, and is permitted to escape through the pipe immediately after the discontinuance of the electricity. The strength of the current is varied according to indications, and the duration of the treatment lasts from ten to twenty minutes when none but the rectocolonic application is made, and from five to ten minutes when both the internal and external treatments referred to above are carried out.

In using faradic electricity, it should be borne in mind that the strong negative electrode is best when the object is to excite muscular contraction, and the positive or *soothing pole* when sensitiveness and soreness are to be relieved.

The séances are given at first daily, then every two or three days, after which the interval between the treatments is lengthened, as the stools become more frequent.

General faradization is indicated in the treatment of constipated subjects suffering from auto-intoxication and general debility because of its tonic action upon the various structures of the body. This electric procedure exhilarates the patient, diminishes pain, nervousness, depression, headaches, dissipates fatigue, and energizes the digestive organs. Furthermore, it equalizes the circulation, restores cold hands and feet, favors nutrition, encourages more regular evacuations, and in various other ways helps the patient to regain his health.

During general faradization the patient may sit upon the negative electrode, or it may remain in contact with his feet, while the positive electrode is applied first to the head and spine and then to other parts of the body. The general treatment lasts from about twenty to thirty minutes, and may or may not be made use of in combination with local faradization.

The **sinusoidal current** is useful in the treatment of constipation because of its local and general tonic effect, and its beneficial action in preventing nausea, lessening flatulence, relieving pain and soreness, and minimizing or arresting the intestinal contractions of spastic constipation (Fig. 137).

Sinusoidal electricity may be employed in the same manner as the faradic, which has been described; or after the method of Herschell, who employs three electrodes. In one of Herschell's procedures two electrodes are placed respectively upon either side of the spine, while the third remains stationary over the epigastrium, or is moved about over the colon; in the other, his rectal electrode is introduced and allowed to remain in the bowel, while the other electrodes are placed one beneath the back and the other upon the abdomen, where it is moved about over the abdominal viscera. Herschell's electrode is of metal and covered with a membranous bag which, when filled with water, becomes a good conductor. It has a special device for breaking the current when this is desirable. The Herschell method is very effective in relieving persons suffering from digestive disturbances, chronic atonic constipation, dilatation and displacement of the stomach and intestine, and costiveness arising from mucous and membranous colitis.

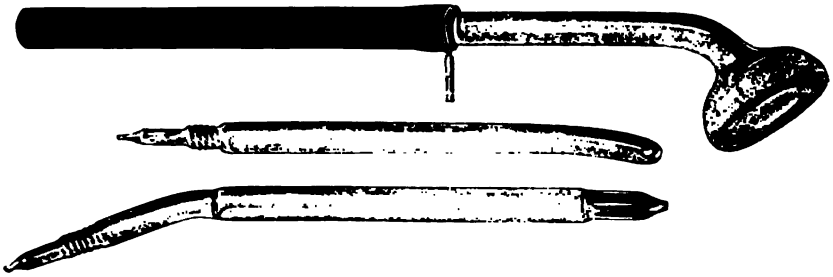

Fig. 137.—Sinusoidal electrodes for high-frequency currents if made of glass.

In giving sinusoidal faradization, the current should be increased until contraction of the musculature ensues. Experience has shown that the higher number (50 or more) of cycles are less effective in improving the condition of the bowel than the fewer cycles.

This current may be effectively combined with massage (electromassage) in the treatment of atonic constipation, the operator standing upon one plate, while another is placed under the patient's back. In this way, while the manipulations are applied to the abdominal muscles, liver, and colon, the electricity passes from the operator over to the patient, producing a sensation of the muscles being raised up bodily, as they quiver under his hands.

Galvanofaradization, or the Watteville current, is adaptable to both local and general purposes, and consists in applying both the galvanic and the faradic currents at the same time and by means of the same electrode.

Galvanofaradic electricity possesses the capacity of toning up the local superficial and deeper structures through the action of its *faradic* current, and of relieving sensitive and irritable parts and muscular spasms through the soothing action of its *galvanic* current; consequently, this form of electricity may be employed to advantage in *atonic* constipation, where the bowel needs strengthening and the mucous glands stimulating, in spastic costiveness, to relieve and prevent enterospasm, and in mechanical constipation (obstipation), to arrest pain and diminish intestinal irritability. This form of electricity is given by placing the large plate (anode) against the spine, while the other electrode (kathode) is applied over the abdominal viscera or introduced into the bowel.

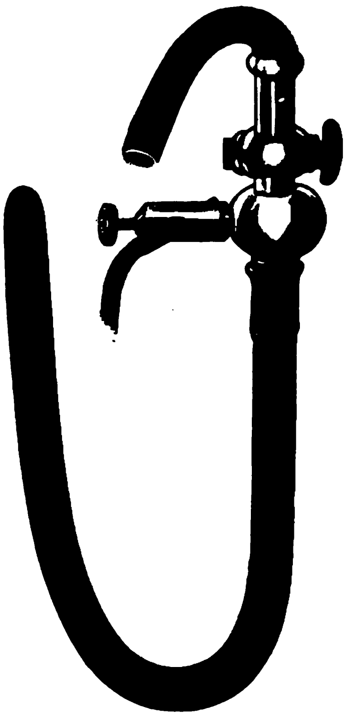

Fig. 138.—Hydriatic electrode (Boas).

Galvanic Electricity.—Galvanism has a broader field of usefulness in medicine than other electric currents because of its electrotonic and electrolytic action. It is employed in exactly the same manner as the faradic current. Its value in atonic constipation can be materially enhanced by applying a very broad electrode to the spine and by frequently interrupting and occasionally reversing the current. In order to avoid doing harm the amperage employed must be carefully watched. As a general rule it is safe to increase the current until the patient complains of discomfort. Ordinarily, I use the continuous current upon the abdomen, colon, or other parts being treated for from five to eight minutes, then resort, for the same length of time, to the interrupted current, breaking it every twenty seconds, and conclude the treatment by an occasional reversal.

Electricity is used a little stronger during interruptions than when it is allowed to flow continuously. When making intrarectal or colonic applications by means either of metallic or rubber irrigating electrodes (Fig. 138), I begin with 2 ampères and gradually increase the ampèrage up to 6 or 8; in obstinate cases until 20 are reached.

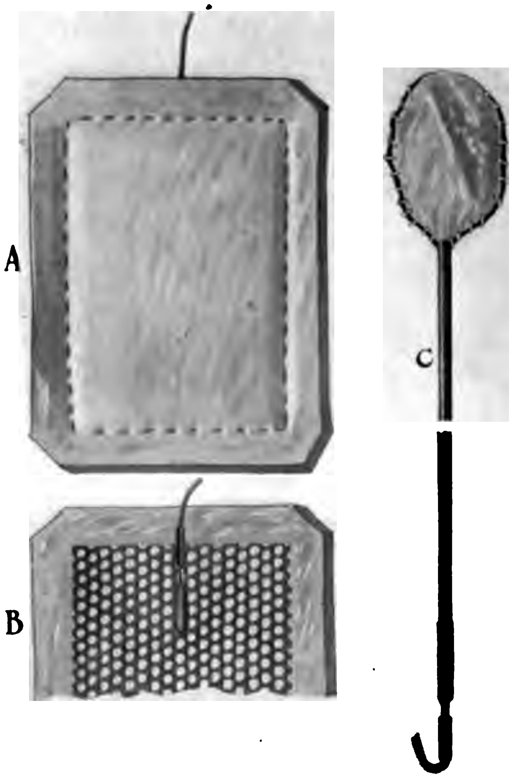

Fig. 139.—Stationary and movable electrodes for the back.

The treatments last from ten to fifteen minutes, and are repeated every other day until marked improvement manifests itself, when they are gradually moved farther and farther apart. Constipation can be more quickly and effectively overcome by the aid of galvanism when the positive electrode is placed against the spine or abdomen (Fig. 139), and the negative is inserted into the water-filled bowel, than when the positive and negative poles are applied to the spine and over the abdomen respectively.

Galvanic electricity (continuous current) increases the expulsive powers of the abdominal muscles, energizes the liver, and favorably influences peristalsis through its action in stimulating the smooth muscular fibers of the intestine to contract. It increases glandular secretion largely through its powerful action upon the cerebrospinal and sympathetic nervous systems. It is not only serviceable in bringing about more prompt and more frequent evacuations, but is of inestimable value in relieving and preventing neuralgias, insomnia, hysteria, melancholia, and other nervous phenomena so frequently encountered together with chronic constipation. This form of electricity can be used to advantage in relieving sensitive spots of the spine and elsewhere, discomforts from meteorism, and muscular spasms directly and reflexly, through its soothing effect upon the nerves and their centers.

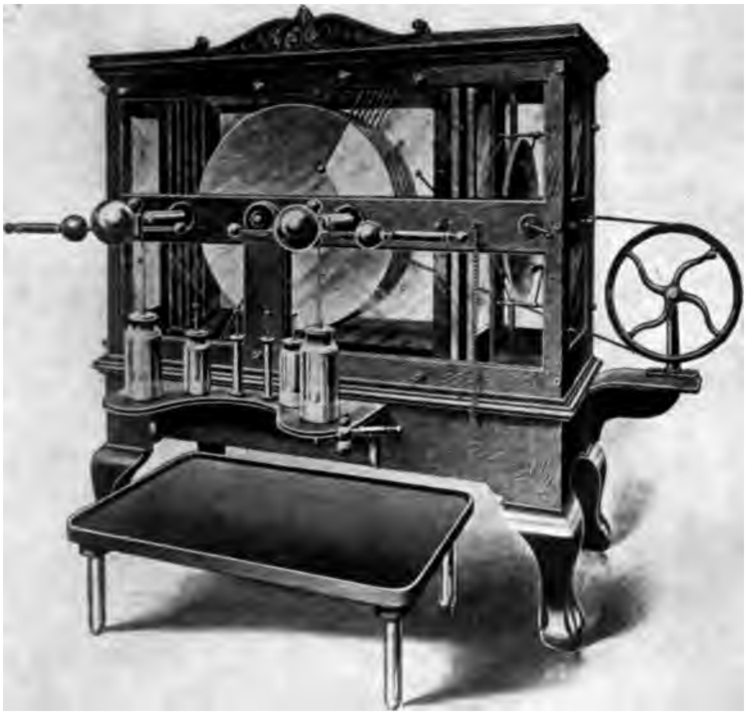

Fig. 140.—Static machine.

The effects of galvanic electricity upon the bowel vary; in some cases immediate evacuation is excited, but in most instances characterized by a favorable outcome the improvement is gradual and a permanent cure is not obtained short of several weeks' treatment.

Static electricity (see Static Machine, Fig. 140), in the form of *sparks*, the *bath*, *breeze* (*souffle*), *friction*, and the *Morton induction current*, alone or in combination, when applied to the skin or within the bowel is a great help in correcting the constipated state and in building up the system of patients suffering from general debility. These applications are very helpful in improving the functions of the gastro-intestinal tract, in overcoming paresis and atony of the colon, and in relieving insomnia, hysteria, neuralgia, and melancholia.

The **Morton current** is especially efficacious for increasing the frequency of the stools, and the reaction subsequent to this form of electricity is similar to that produced by massage.

The Bordier electrode will be found satisfactory when applied to the rectum.

Static electricity is by no means a *specific* for constipation, but it constitutes a reliable physical therapeutic procedure and a valuable aid in the correction of this complaint, together with other measures already suggested. This remark holds equally good for the *high-frequency alternating current.*

Like other forms of electricity, *the high-frequency current* can be applied within the bowel, to the spine, to the abdomen, and to other external parts, glass electrodes being used for the purpose. When given in the proper strength and for a short time its action is similar to that of faradization. The treatment has an immediately soothing and quieting effect upon nervous patients, while later on it serves to improve nutrition and to increase the functions of the liver, stomach, intestine, and body in general.

Electrohydrotherapy (baths) renders efficient service in helping to increase the frequency of the evacuations and in overcoming the symptoms of intestinal auto-intoxication.

I have on many occasions succeeded in relieving constipation and associated disturbances solely by the use of electricity and water drinking, cold moist abdominal compresses, douches, and baths. By this combination the valuable beneficent tonic reaction incident to the stimulating effect of electricity is secured, as well as the mechanical and thermic benefits of the water. The integumentary nerves are profoundly influenced and transmit the stimulus to the nerve-centers, from whence it is transferred to the different parts of the body, resulting in an improved circulation, increased metabolism, and raising of the standard of health in general.

Water drinking adds to the efficacy of the electrohydrotherapeutic treatment by softening the feces and energizing both the mucosa and the musculature of the intestine.

The *galvanic*, *faradic*, *sinusoidal*, and *galvanofaradic* currents may all be successfully employed in connection with hydrotherapy, but galvanism has given the best results in my experience. The electricity may be applied in the form of baths, with the water *cold* (60° to 100° F.), when a tonic effect is aimed at, and *hot* (110° F.) when the conditions call for a soothing action. From what has been said it will be inferred that the lower temperatures are indicated in atonic, and the higher, in spastic and mechanical, constipation.

In some instances it is advantageous to administer electricity in some other manner, and it may be given either before or after the bath, which may or may not be followed by friction. An ordinary wooden or porcelain tub will serve for electrohydric baths. When galvanism is employed, it is safer to rely upon the electricity generated by cells than that obtained from the street current.

The patient can rest his feet near a large copper, lead, or carbon electrode, while the other electrode, in the form of a rod extending across the tub, may be held in the hands, or both may be submerged; or one electrode may remain stationary, while the other is moved about over the body, or is applied directly to the abdominal muscles, the liver, or the colon. When the electrodes are submerged and remain beneath the water, they are covered with wooden seats to prevent their doing injury to the patient.

After the tub has been filled and the patient has assumed the recumbent posture, the current is gradually turned on until a feeling of discomfort is complained of. The duration of the bath varies from fifteen to twenty minutes, and the ultimate results are very much better when it is followed by a cold or Scotch douche and a brisk rub down.

The *faradic bath* is indicated in the same class of cases as is *general faradization*, and, like it, will be found effective in toning up the circulatory, nervous, and muscular systems, while the faradic-sinusoidal bath has both a tonic and soothing action, and may be employed to improve the condition of debilitated persons, to relieve headaches, visceral pains and soreness, and to induce sleep.

The *galvanic* and *galvanofaradic* baths are also very useful in quieting nervous patients, strengthening muscular contractility, augmenting the secretions, encouraging elimination, and improving nutrition.

In concluding my remarks upon electricity, I wish to state that it is not advisable to employ this therapeutic procedure for the relief of constipation in persons suffering from intestinal obstruction, ulceration, hemorrhage, certain skin affections, heart disease, arteriosclerosis, and in menstruating or pregnant women.

OTHER PHYSICAL THERAPEUTIC PROCEDURES

Having in the preceding chapters pointed out the usefulness of exercise, massage, electricity, and mechanical vibration in the treatment of constipation, I will now proceed to discuss a few physical measures which are not so well known, but which will often prove effective in overcoming the constipated state.

Rectal Instrumentation.—The introduction of the proctoscope, bougie, anal dilator, or other contrivances of considerable size into the bowel often serves to stimulate peristalsis in an artificial manner, and bring about an evacuation immediately or shortly after the withdrawal of the instrument. Having frequently observed the tendency of instrumentation to excite a movement during the examination or treatment of patients with rectal ailments, I now resort in suitable cases to this method of encouraging an evacuation.

The repeated introduction and partial withdrawal of the finger or proctoscope, sigmoidoscope, or No. 10 Wales bougie will often stimulate a desire to stool, and if the patient is requested to get down from the table and enter the toilet he will in many instances have an immediate and satisfactory movement; on the contrary, if he defers going to the closet for a considerable time, the effect of the stimulation will wear off and the desire to evacuate the bowel will pass away. Massage of the rectum in this way permanently improves the condition of persons suffering from atonic constipation because it strengthens the intestinal musculature and stimulates the glands to greater activity.

Anal dilators which are permitted to remain *in situ* stimulate peristalsis to a slight degree only, but are an aid in securing more easy and frequent movements through their action in dilating the anal canal.

Inflation of the rectum and colon through the proctoscope or sigmoidoscope with air, oxygen (Fig. 141), or carbonic acid gas will frequently serve to stimulate a quick evacuation and help to secure regular daily stools until the constipation has been overcome by this [illegible] other therapeutic measures. The bowel may also be inflated [illegible] a small Wales bougie by using a Politzer bulb or by connecting [illegible] ordinary compressed-air tank.

[illegible] occasions I have succeeded in starting up peristalsis by [illegible] through the sigmoidoscope, of marbles, cotton balls, [illegible] flexure or rectum, where they were permitted to remain until expelled. I have also frequently employed a modified Barnes bag (Fig. 222), using air, gas, or water to stretch the bowel, stimulate peristalsis, and hasten an evacuation, also to divulse the external sphincter, rectum, sigmoid flexure, or O'Beirne's sphincter, when these parts were narrowed by pathologic changes or muscular spasm, in order to facilitate the passage of the feces.

In some instances the bag has been left *in situ* for a period varying from a few moments to several hours in order to effect a thorough dilatation of that part of the gut to which it was applied; but when an immediate evacuation was desired, the bowel was repeatedly distended and allowed to empty itself at intervals of about twenty seconds, in order to start up peristalsis and produce the desire to stool. Very rapid divulsion of any part of the intestine is to be condemned because of the intense pain induced by it. The inflow of gas, air, or water should be under perfect control and accurately measured, in order to avoid the danger of rupturing the gut. For the purposes mentioned above, Hirschmann's dilator (Fig. 224) will be found convenient and practical.

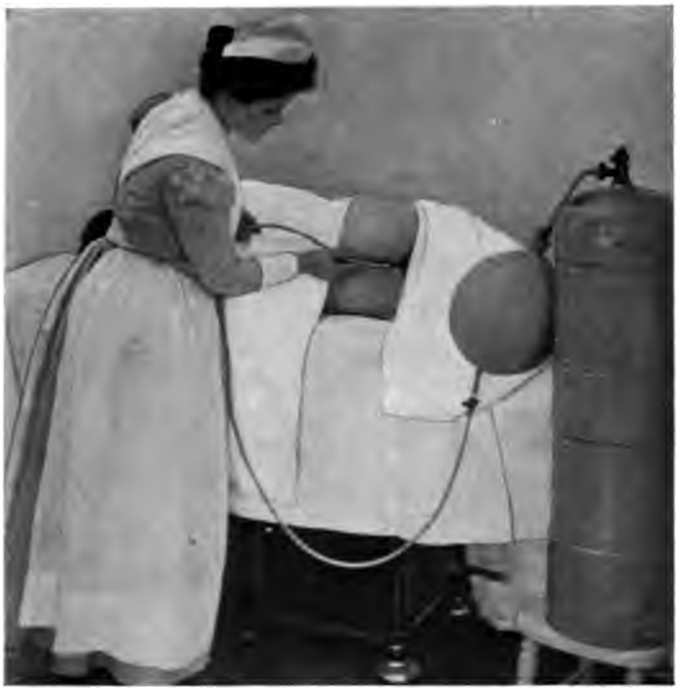

Fig. 141.—Intestinal oxygen bath, as administered by the author.

Rectal tamponing with cheese-cloth, absorbent cotton, or lamb's wool, as suggested by MacMillen, is another way of stimulating more frequent evacuations. This authority has succeeded in curing chronic atonic constipation by the aid of this procedure when continued for several weeks or longer. The tampons are permitted to remain in the rectum for four or five hours, when they are removed, and if the object for which they were introduced is accomplished the withdrawal will be followed by a movement.

I have been enabled to hasten the stools excited in this way by dusting boric acid over the tampons or by dipping them in glycerin before they were inserted, and have obtained better results where the tampons were placed in the sigmoid than when the rectum alone was distended. The originator of this procedure claims marked curative properties for it, but my experience leads me to believe that while it is an adjunct to the treatment, it cannot be relied upon for the permanent cure of chronic atonic constipation except when reënforced by other therapeutic measures recommended elsewhere.

All the physical procedures just described are contra-indicated in the treatment of chronic constipation caused or complicated by fissure, ulceration, inflamed hemorrhoids, or other painful affections of the rectum or anus.

CHAPTER XXVI

MEDICAL TREATMENT OF CONSTIPATION

General Remarks.—Before proceeding further, I wish to take this opportunity to state my views upon the medical treatment of constipation.

I believe that drugs properly administered accomplish a very great deal toward the relief and cure of *acute* and *spastic* constipation, but, with a few exceptions, consider them inefficient in the curative treatment of chronic *atonic* and *mechanical* constipation.

I am of the opinion that chronic costiveness can be cured in the vast majority of cases without the aid of medicines by means of *education*, *exercise*, *psychotherapy*, *dieting*, *hydrotherapy*, *massage*, *mechanical vibration*, and *electricity*—procedures with which I have already dealt.

My experience justifies the belief that drugs are helpful in the treatment of this complaint in certain cases when employed in conjunction with the therapeutic measures named, and further, that they are rarely effectual when used alone.

It has been my custom *not* to resort to purgatives, cathartics, and laxatives until I have first tried and found wanting the other more simple, less harmful, and more effectual therapeutic procedures at our disposal, and have had abundant reason for being satisfied with the outcome. However, now and then very obstinate cases have been encountered which could be neither relieved nor cured without the supporting aid of the neuromuscular tonic laxative and other medicines. While I seldom employ drugs for the permanent cure of chronic constipation, I nevertheless resort to them quite frequently for other purposes, and usually under the following circumstances, viz.:

1. To bring about the necessary evacuations where constipation develops as a *symptom* of some other disease.

2. To cleanse without delay the bowel of persons suffering from any and all forms of constipation, who show pronounced symptoms of intestinal *auto-intoxication* resulting from putrefying food or fecal accumulations within the intestine.

3. In cases of partial obstruction due to stricture, cancer, enteroptosis, angulation, flexure, or other affections causing occlusion, in order to soften the feces and permit them to pass.

4. To regulate the stools of persons afflicted with serious heart lesions, pneumonia, fevers, gastritis, enteritis, acute infectious diseases, appendicitis, peritonitis, abdominal and pelvic abscess, and similar ailments.

5. To cleanse the rectum of feces and other waste matter preparatory to surgical operations.

6. To rid the bowel of flatus, toxins, and scybala, causing a postoperative temperature or pain in securing the necessary daily stool.

7. In very old people, chronic invalids, the insane, and patients suffering from lesions of the brain or spinal cord, which through their influence upon the intestine diminish peristalsis or interfere with the act of defecation.

8. To lubricate the gut and soften the feces, in order to prevent or lessen the postdefecatory pain of patients afflicted with hemorrhoids, fissure, ulcer, sphincteric spasm, or other painful affections of the anorectal region.

9. To obtain regular evacuations for patients suffering from chronic constipation, whose occupations are such that they cannot afford the time or expense for a systematic course of treatment, and for those living in unsettled districts where they have not the advantage of modern appliances for treating this complaint.

10. To open the bowels from day to day in individuals suffering from chronic constipation, who are content to go on indefinitely relieving the bowel in this way because they have not the inclination, patience, time, or means to undertake a course of treatment which would permanently cure them.

The *medical* treatment of habitual constipation has in recent years become very unpopular, and justly so, for a number of reasons: *first*, and most important of these is, that this plan of treatment rarely effects a permanent cure; *second*, when medicine is employed to secure the evacuations, the dosage has to be continually increased, or a new drug must be substituted from time to time, in order to obtain the desired results; *third*, frequent purging interferes with the functionating power of the gastro-intestinal tract and causes other distressing disturbances; *fourth*, many of the cathartic and laxative drugs aggravate the constipated state because they leave the bowel in a condition of fatigue and overwork, and, moreover, some of them contain astringents which secondarily exert a constipating effect; *fifth*, many of the reliable cathartics cause severe griping and other discomforts, and, in addition, an unnecessary and undesirable number of evacuations, and *sixth*, both the profession and the laity are becoming more and more familiar with the good results obtainable from attending regularly to the hygiene of the bowel, dieting, exercising, and endeavoring to improve peristalsis and glandular secretion by means of the physical therapeutic procedures already described.

I believe every one will agree with me when I say that it is an easy matter to secure daily evacuations with the aid of drugs, but that it is a much more difficult problem to get the patient up to the point where he will continue to have copious and regular evacuations after his medicine has been discontinued.

Having pointed out the *evils* of the medical treatment as I conceive them, I will now proceed to extol the *virtues* of this method of curing constipation, and at the same time endeavor to show how and when the different remedies, under varying conditions, may be most satisfactorily employed for the alleviation and cure of this most common and persistent complaint.

Much can be accomplished in certain cases toward relieving and curing constipation by the intelligent selection of remedies and the giving of definite instructions to the patient as to the manner in which he should use them; but, on the other hand, but little good and much harm results where drugs are indiscriminately prescribed, and the patient is permitted to take them at will and in amounts to suit his fancy.

The successful practitioner makes a careful diagnosis, and then proceeds to prescribe remedies which will cause little or no griping, bring about an evacuation resembling the normal, and at the same time strengthen the intestine. As a general rule, it is desirable to have the stool occur immediately after the morning meal, because food taken into a fasting stomach tends to stimulate peristalsis, and further, because this enables the patient to empty the bowel before proceeding to his daily work.

Some drugs act much quicker than others, and because of this fact it is necessary to administer them at the midday or evening meal on the previous day or upon arising, in order to have the evacuation take place after breakfast. The occupations of some are such as not to permit their taking time for a movement in the morning; such persons should time their medicine with a view to securing the evacuation in the evening.

Persons suffering from chronic constipation complicated by painful affections of the anus should take a laxative both on arising and retiring, in order to promote soft, small movements and avoid the pain incident to one large, hard passage. Constipated persons should be persuaded to patronize harmless drugs, which when taken in small doses will bring about a daily evacuation and in the end will effect a permanent cure.

With some this is a difficult task, because they have conceived the ridiculous idea that they can do much better by going several days without an evacuation and then taking a drastic purgative, which will, as they express it, give them a good cleaning out. In reality, drastics and hydragogues should never be employed in the systematic treatment of constipation, nor should they be used for temporary unloading of the bowel, except in individuals who need depleting, and in those exhibiting the toxic symptoms of intestinal poisoning.

Laxative medicines do not always produce identical results in persons who apparently suffer from the same type of constipation; in one instance a remedy is readily found which will suit the individual, and do good service for a long time, without need of increasing the dose to secure the daily stool, while in another the dose must be repeatedly heightened in order to obtain the same result, or another drug be substituted, which for a time gives satisfaction and then becomes ineffectual.

With the exception of a very few tonic remedies, the medicinal agents employed for the temporary relief of atonic constipation have either a laxative or a purgative action, variable in degree. Food laxatives should be taken at meal-time, preferably in the morning. Salines and other "hurry up" cathartics give less trouble when taken early in the morning. Cascara may be administered satisfactorily either in the morning or at night, and the tonic or dinner pills yield the best results when taken with the evening meal.

Drugs prescribed with a view to securing evacuations may be administered by mouth, in the form of enemata, or injected subcutaneously; as a general rule, however, the first-named method is the most popular one.

Before outlining the medical treatment, it is well to bear in mind that there are different types of constipation, and to ascertain, in the first place, if the case under consideration is *acute* or *chronic*. If it is found to be chronic constipation, means must be adopted to determine whether it is of the *atonic* (*habitual*), *spastic*, or *mechanical* variety.

After discussing the medical treatment of chronic (habitual) spastic and mechanical constipation, I will, in turn, briefly consider the treatment of acute costiveness and the constipation of children.

After having completed the diagnosis, every patient found to be suffering from chronic atonic constipation should be asked the question, "*Do you wish to have some remedy prescribed which will give you temporary relief, but which must be taken for an indefinite time, or do you desire a course of treatment which will tend toward a permanent cure?*" When the patient has answered this question, the physician can immediately decide upon the course to be pursued.

There are a great many drugs which when administered internally or in the form of enemata will serve to stimulate peristalsis, but have no curative power; while, on the other hand, there are exceedingly few (less than a half dozen) medicines which will increase the muscular tone and glandular activity of the bowel and otherwise assist in the permanent control of the constipated state. It is not necessary at this time to name the remedies best suited for the temporary relief of constipation and those which are to be relied upon to cure this complaint, for the reason that the indications of the various drugs for these purposes will be considered under their respective headings. So many drugs and combinations of remedies have been advocated for the relief and cure of constipation that it is impossible in a work of this scope to attempt even a mention of them all, hence I will confine the discussion of the medical treatment of this affection to those drugs which are considered the most reliable by present day authorities.

Remedies which excite evacuations are, for want of a better expression, designated as *cathartics*. It is known that cathartics increase the bowel movements by liquefying the feces, lubricating the intestine, increasing glandular secretion, and stimulating peristalsis; but up to the present time the exact manner in which drugs produce these widely varying effects has not been satisfactorily elucidated.

Cathartics may be grouped into (*a*) laxatives, (*b*) purgatives, (*c*) drastics, (*d*) hydragogues, and (*e*) cholagogues.

Laxatives are the mildest of the intestinal stimulants, and cause softened evacuations resembling the normal through their action in promoting peristalsis and glandular activity. In this class of remedies are to be found such popular medicines as cascara sagrada, manna, tamarind, ox-gall, sulphur, olive oil, hyoscyamus, and the laxative foods.

Purgatives produce a slightly more decided action than laxatives, and usually excite one or more free semisolid stools by causing a more active peristalsis and transudation along the intestinal tract. Purgatives in very small doses may act as laxatives; while, on the other hand, laxatives in very large doses may act as purgatives. To the purgative group belong aloes, senna, rhubarb, castor oil, and calomel.

Drastic cathartics, through irritation to the gastro-intestinal canal, produce active peristalsis and profuse transudation, resulting in multiple fluid stools. These drugs are but rarely employed in the treatment of constipation because they produce much griping pain, enteritis, and an unnecessary number of movements, and because their absorption results in far-reaching disturbances. The better-known drugs of this class are podophyllum, colocynth, jalap, gamboge, elaterium, and croton oil.

Hydragogues produce large watery motions through their liberal withdrawal of water from the walls of the intestine. The salines, such as sodium sulphate, magnesium sulphate and citrate, potassium tartrate and bitartrate, and sodium tartrate, constitute the most reliable hydragogue cathartics.

Cholagogues in one way or another stimulate the liver, increase the flow of bile, excite active peristalsis, and produce greenish liquid evacuations. Mercury, aloes, leptandra, euonymin, and iridin are the representative cholagogue remedies.

The general tendency in recent years is to abandon the more violent cathartics and to substitute in their place the milder laxatives and purgatives.

In order to add to the efficiency of drugs employed for the relief of constipation, to minimize gastro-intestinal irritation, to improve the general health of the patient, and to rid the bowel of toxins, it will be found advantageous to combine one or more of the above-named drugs, or to employ them in connection with remedies which will improve the nervous and muscular tonus and the quality of the blood.

Many individuals suffer from an occasional attack of constipation only, while others complain of costiveness, but to a very slight degree; under such circumstances the *food laxatives*, water, porridge, syrup, honey, raw and stewed fruits, and liberal amounts of butter, bacon, and salad oil—which tend to soften the feces, lubricate the bowel, and stimulate peristalsis—should be given the precedence before medicinal laxatives, because they will do less harm and yet serve to bring about the desired stools.

I will now proceed to discuss the individual remedies commonly employed in the treatment of chronic constipation, and in conclusion, I will append a few reliable formulæ in order to illustrate how the different medicines may be successfully combined with a view to relieving and curing constipation.

Cascara sagrada (*Rhamnus purshiana*), in one form or another, has attained a higher degree of popularity with the profession, both in this and other countries, in the treatment of chronic constipation than any other remedy suggested recently or in the remote past. In fact, it is the drug par excellence when used alone or in combination with other remedies, because it produces the most natural of the artificially obtained evacuations, comparatively no griping or other discomfort, and further, because it can be employed with equal success to secure a quick evacuation and relieve *acute* costiveness as to improve the condition of persons suffering from chronic atonic constipation.

Another great advantage of cascara sagrada is that it can be satisfactorily combined with many other remedies, which when simultaneously used are not only very helpful in securing copious and regular evacuations of normal consistency, but also assist to a notable extent in relieving the discomforts referable to the complications and sequelæ of the constipated state.

Cascara is a mild laxative and possesses the very great advantage over other drugs that it can frequently be used indefinitely without harm or the necessity of increasing the dosage. In many instances, after beginning with the full dose, the quantity prescribed can be gradually reduced from time to time, without affecting the character or interfering with the regularity of the evacuations, and it is in virtue of this beneficial action of cascara that this remedy has come to take the place of formerly popular purgatives and favorite laxatives.

Cascara sagrada has a bitter taste, and the greatest drawback to this remedy was the difficulty encountered in preparing it in a palatable form; however, this objection to an otherwise almost ideal remedy has been overcome in some of the newer preparations, or by administering it in cordials, the syrup of orange peel, or in the form of tabloids. This drug may be successfully prescribed in the form of the fluidextract, 10 to 20♏ (0.60–1.3 cc.); aromatic fluidextract, 10 to 30♏ (0.60–2.0 cc.); extract, 2 to 8 gr. (0.12–0.5 gm.); "Cascara Cordial," ʒj to vj (4.0–24.0 gm.); maltzyne or maltine and cascara sagrada, ʒj to iij (4.0–12.0 gm.), or cascarin, gr. ½ to 15 (0.03–1 gm.).

Of the cascara preparations, I place more reliance upon the fluidextract and the powered extract in pill form for adults, but for children I prescribe the cordial or the aromatic fluidextract. Ordinarily, evening doses will suffice, but occasionally it is advisable to administer the medicine both night and morning.

When very large doses are required to secure copious evacuations, this indicates the necessity for combining the cascara with iron, strychnin, belladonna, hyoscyamus, calomel, euonymin, iridin, or other remedies which will improve the quality of the blood, tone up nerve and muscular structures, mildly stimulate the flow of bile and pancreatic juice, or exert a soothing effect upon the nerves and other centers, and thereby diminish intestinal irritability. Cascara promotes satisfactory evacuations through its tonic effect upon the musculature and glands of the intestine and its slightly stimulating action upon the liver.

This remedy should never be administered in large doses for a prolonged time, because under these circumstances it evidently does not meet the indications of the case, and further, for the reason that it will in time excite a troublesome enteritis.

Regulin is a remedy suggested by Schmidt (Dresden) for overcoming constipation in cases where the trouble is due to an insufficient quantity of water in the feces, and where the amount of indigestible residue is too small to excite active peristalsis. Regulin is agar-agar to which a 25 per cent. solution of the aqueous extract of cascara sagrada has been added. This remedy stimulates peristalsis, increases the fluidity of the stools, and adds materially to their bulk. The evacuations following the administration of agar-agar alone or in combination with cascara are copious, soft, and resemble somewhat those following the administration of Carlsbad salts or other hydragogue cathartics.

Regulin may be obtained in packages, the dose of which is ʒj to ℥ss (4–15 gm.), and administered with breakfast food, stewed apples, or mashed potatoes; or it may now be obtained in the form of chocolate flavored lozenges.

Aloes, next to cascara sagrada, is prescribed more frequently in the treatment of constipation than any other chemical, and constitutes one of the ingredients of all popular vegetable pills destined for the regulation of the bowels. The usefulness of aloes for this purpose is attributable to its direct action upon the large intestine, the absence of gastric disturbances, and the very slight amount of griping induced by it, and also to the copious, well-formed, dark brown stools which follow its administration, and cause no discomfort in the process of evacuation.

With the exception of podophyllin, aloes has the slowest action (ten to twelve hours) of all the milder purgatives, consequently, it is not the drug of predilection when a quick action of the bowel is desired. It is, however, a most admirable agent, especially when prescribed as a dinner pill, for the relief of old debilitated patients and others who ask for a medicine which will, if taken at night, secure a satisfactory movement for them on the next morning, without causing distress.

Preparations of aloes have a tendency to irritate the rectum, and because of this it is not wise to employ them to regulate the stools of persons suffering from anal fissure or inflamed hemorrhoids; neither is it advisable to administer this drug to plethoric patients or those who suffer from intestinal catarrh, or to pregnant women and nursing mothers.

In the treatment of costiveness, the most useful preparations of aloes are aloin, ¼ to 2 gr. (0.015–0.12 gm.); purified aloes, 1 to 10 gr. (0.06–0.6); tincture of aloes and myrrh, fʒss to ij (2.0–8.0 cc.), and in the form of pills in combination with other remedies (see Formulary); the dose of the latter varies from one to five pills (at night), depending upon the strength of the ingredients and the obstinacy of the case.

Rhubarb (*Rheum*) should never be independently employed in the systematic treatment of chronic constipation, nor should it be prescribed in large doses to secure an immediate evacuation, for the reason that its astringent qualities produce a secondary constipating effect after its cathartic action has subsided. Rhubarb acts very well indeed in the uncommon cases of alternating constipation and diarrhea; it is also a reliable remedy to employ in the treatment of habitual constipation, when used in combination with medicines which will counteract its astringent effects, because of its tendency to improve the appetite and digestion, to increase intestinal secretion and the flow of bile, and to strengthen the intestinal musculature. Rhubarb may be prescribed in the form of a pill (*Pilula rhei*) containing 2 gr. (0.12 gm.) of rhubarb and 1½ gr. (0.09 gm.) of aloes; fluidextract, 10 to 30♏ (0.6–2 cc.); aromatic tincture, fʒss to j (2.0–4.0 cc.); syrup, fʒj to vj (4.0–24.0 cc.), or in one of the combination cathartic pills given in the Formulary.

Podophyllin always acts slowly, is a laxative when administered in small doses, and a purgative when larger amounts are given, and, like other remedies of this class, is more effectual in pill form when used in connection with other medicines. In liberal doses, podophyllin increases the biliary and other secretions in from ten to twelve hours. This drug is indicated in constipated patients who suffer from weak digestion, nausea, vomiting, biliousness, jaundice, or headache.

The dose of podophyllin (*Resina podophylli*) varies from ⅛ to ½ gr. (0.008–0.03 gm.); the fluidextract, 5 to 20♏ (0.3–1.2 cc.), while in the pill form the dose depends upon the remedies with which it is combined.

Colocynth, *jalap*, and *senna* may be relied upon to clear the bowel effectively and give temporary relief, but they enter slightly or not at all into the treatment of chronic costiveness, except when combined with other vegetable cathartics, which serve to modify their action.

A useful infusion of senna may be made by placing the leaves or pods in a bag and putting this into a kettle in which prunes are stewing; the active principle of the drug thus permeates the prunes and adds to their laxative action. Taken at night, this remedy causes but little discomfort and excites copious and easy evacuations. Compound cathartic and compound colocynth pills (see Formulary) are effective agents for the thorough clearing of the bowel when the fecal evacuations have been delayed for a considerable length of time; after the intestine has been emptied, cascara sagrada or a dinner pill should be prescribed to secure future movements.

Castor oil (*Oleum ricini*) is the remedy par excellence to relieve acute constipation, and in chronic costiveness to get rid of fecal impaction. Ordinarily, the stools follow in four or five hours after administering from ℥ss to j (15.0–30 cc.) of this drug, with no preliminary suffering from colic or flatulence. Castor oil is also a serviceable remedy in cases of constipation alternating with diarrhea, and where there are collections of mucus or other irritating substances within the intestine. In combination with opium, it constitutes the most effectual remedy for relieving lead-colic and enterospasm, and gives very satisfactory results where it is desirable to have an active purge, if administered in connection with 1 ounce (30 cc.) of the aromatic syrup of rhubarb.

Castor oil is objectionable to some because of its oily taste and tendency to nauseate, but these difficulties can in a measure be overcome by administering it in capsules or disguising it with whisky or orange-juice. Castor oil should not be continuously prescribed to relieve the bowel because it often secondarily exerts a constipating effect.

Compound licorice powder (*Pulvis glycyrrhizæ compositus*) is a drug frequently employed for the relief of pregnant women who are constipated, to prepare patients for operation, and to move the bowels under other circumstances, but it has only slight, if any, curative powers. When administered at night in ʒj to ij (4–8 gm.) doses in half a glass of water it will, under ordinary circumstances, stimulate one or two well-formed movements on the following morning, without causing griping or other discomfort. This preparation is composed of the following ingredients:

℞. Fol. sennæ Rad. glycyrrhizæ	āā	ʒiiss	10.0
Fruct. fœniculi Sulph. depur.	āā	ʒij	5.0
Sacch. alb.		℥j	30.0

Mercurials, in the form of calomel, in fractional doses, repeated at short intervals until at least 2 gr. (0.065–0.13 gm.) have been taken, or blue mass, in from ½ to 20 gr. (0.03–1.3 gm.) doses, may be prescribed with very satisfactory results for the relief of constipated individuals who suffer from a bilious attack or intestinal auto-intoxication, in order to stimulate the flow of bile and counteract the influence of toxins.

It is customary to combine bicarbonate of soda with calomel to augment biliary stimulation, diminish gastric irritation, and increase the alkalinity within the small intestine. Mercurial purges should always be followed by the cleansing of the gastro-intestinal tract with one of the saline cathartics. Mercury, in one form or another, should be added to the medical treatment of constipation in syphilitic patients.

Saline cathartics are very generally used by persons suffering from constipation, but in so far as I have been able to observe they have but little if any tendency to cure this complaint. The almost universal habit of taking salts to secure an immediate evacuation is a most ***pernicious*** one, and should be condemned, because it eventually aggravates the constipated state and produces other harmful results. The saline drugs do not secure evacuations by stimulating peristalsis to the same degree as do remedies like cascara, aloes, and colocynth. This class of cathartics increases the frequency of the stools by withdrawing fluids from the intestinal wall, and by hurrying the diluted contents of the stomach and small intestine through the alimentary canal so quickly that absorption is impossible. They have been known to induce anemia when continuously given in large doses and for a long time; usually they are non-irritative, and because of this they are frequently employed to relieve catarrhal affections of both the small and large bowel. From what has already been said concerning the action of the "salines," it may be correctly inferred that they are useful remedies for the prevention of fecal accumulations and the dislodgment of hard nodular fecal impactions, to keep the contents of the bowel in a liquefied state, and to bring about immediate evacuations when this appears desirable. Large doses of these salts, when administered month in and month out, deplete the patient, upset the digestive process, induce intestinal catarrh, and otherwise disturb the system; but when given in small amounts they may be employed to relieve constipation without producing serious results. Some authorities claim to have obtained cures by the use of these remedies, but my experience with them warrants me in believing that they possess no permanent curative properties in so far as constipation is concerned.

Magnesium and ***sodium salts***, in one form or another, constitute the most generally useful of the hydragogue cathartics. They are frequently employed to prepare patients for operations and to free the bowel quickly of flatus and feces during convalescence, to wash out toxins and diminish hard fecal accumulations, to liquefy and soften the feces in order to minimize the defecatory pain in persons suffering from anal affections, to secure coveted daily evacuations of chronically constipated individuals who cannot or who will not submit to a rational systematic course of treatment, to relieve lithemic and plethoric subjects requiring depletion, to regulate the stools in alternating constipation and diarrhea, and to improve the condition of the constipated who are simultaneously troubled with intestinal catarrh.

Epsom salt (*Magnesium sulphate*) will produce free evacuations when prescribed in doses varying from ʒj to viij (4.0–30.0 gm.).

Magnesium may also be prescribed in the form of ***mineral waters***, such as the *effervescent sulphate* or as the *citrate* (***Liquor magnesii citratis***), the dose of which is fʒvj to ℥xij (23.0–360.0 cc.).

Sodium sulphate may be employed either as a mild laxative or as a purgative, depending upon the amount prescribed, but in ordinary cases from ʒj to ij (4.0–8.0 cc.) obtain satisfactory evacuations.

The *phosphate of sodium* is more popular than either the sulphate of magnesium or soda, because it is not so unpleasant to take and its action is milder and equally efficient. This remedy is agreeable to the stomach and relieves intestinal irritability due to enteritis and enterospasm, consequently it is a desirable agent to employ in the treatment of *spastic* constipation.

Among the hydragogue cathartics, it is the drug of choice for individuals suffering from chronic *atonic* constipation who now and then have an attack of diarrhea or nervousness, insomnia, headache, malaise, or other of the manifestations induced by intestinal auto-intoxication.

Glauber's salt (*Sodium sulphate*) produces the same type of watery stools as do the other saline cathartics and is slightly more irritating to the mucosa of the bowel than the phosphate of sodium; owing to this disadvantage, this drug should not be prescribed for the relief of constipated patients who suffer from enteritis and colitis. It is resorted to most frequently for the proper clearing of the bowel preparatory to surgical operations, and for this purpose it may be administered in amounts varying from ʒij to viij (8.0-30.0 gm.).

Common salt (*Sodium chlorid*) is a very mild laxative, and frequently acts nicely when given in ʒij to iv (8.00–16.00 gm.) doses to mildly constipated individuals suffering from intestinal irritability.

Rochelle salt (*Potassii et sodii tartras*) is a popular and efficient hydragogue cathartic, less distasteful than Epsom salt, and a reliable remedy to employ when a scouring out of the intestine is desirable. When administered in doses varying from ʒj to iv (4.0–16.0 gm.) it causes some griping, which is followed by several fluid evacuations. This salt may in certain cases be advantageously administered in the form of a *Seidlitz powder*, which is composed of the following drugs:

Blue paper: Potassium and sodium tartrate, 120 gr. (8.0 gm.);
Sodium bicarbonate, 40 gr. (2.7 gm.).
White paper: Tartaric acid, 35 gr. (2.2 gm.).

Dissolve the powders separately, then mix, and drink while effervescing.

Seidlitz powders, owing to the carbonic acid generated, afford great relief to patients who suffer from nausea, vomiting, and uncomfortable sensations in the stomach.

Rochelle salt is not a desirable remedy in cases when it is necessary to keep up for a long time the use of some medicine to secure daily evacuations, for the reason that it loses its effect, and enormous and harmful doses must be administered in order to obtain the desired result.

Mineral waters properly belong among the saline cathartics, for the reason that in most instances their effectiveness in producing more frequent evacuations depends chiefly upon the *magnesium*, *sodium*, or *potassium* which they contain.

The purely *thermic* and *mechanical* action of water has been fully discussed in the chapter devoted to Water Drinking, and needs no further consideration at this time.

When it is desirable to obtain frequent fluid passages, large quantities of plain water or a smaller amount of mineral water containing cathartic ingredients should be ordered, but when a single copious stool is the object, a smaller amount of water or one poor in minerals will suffice.

One very great advantage of medicated water is that the patient believes it will do him more good, hence he will conscientiously take it in any quantity and at such times as it may be ordered.

Of the numerous cathartic mineral waters upon the market, I believe the most reliable to be Carabana, Hunyadi Janos, Carlsbad, Congress, Kissingen, Rubinat, Friedrichshall, Homburg, Saratoga, Marienbad, and Apenta.

The laxative effect of these celebrated medicated waters depends upon their temperature, the presence of carbonic acid or the amount of the carbonate, bicarbonate, chlorid, or sulphate of sodium, or the sulphate of magnesium contained in them.

When a very mild laxative water is required, one containing carbonic acid and the carbonate or bicarbonate of soda will give satisfaction. When a more active cathartic is indicated, one containing a liberal amount of sodium chlorid should be prescribed, but when it is desirable to obtain frequent and quick evacuations, one of the *bitter* waters rich in magnesium or sodium sulphate should be selected.

Strongly medicated waters may be prescribed to give temporary relief from acute constipation, but they should rarely, if ever, be resorted to in the systematic treatment of chronic atonic constipation. When follows its administration, and the easy and natural evacuations rise to. Tamarinds may be administered in shape of the con- of senna ʒj to ij (4.0–8.0 gm.), of which they constitute an ant ingredient. Tamarinds also come in boxes in oblong pieces, se of which is one or part of one after each meal. Ordinarily ay be prescribed in from ʒj to viij (4.0–30.0 gm.).

nna is another mild and popular laxative which may be pre- effectually for the relief and cure of constipation in both adults ildren. For the former, it is preferably given as the compound n of senna, fʒj to iij (30.0–90.0 cc.), and for children it may be ered in milk in combination with senna, be eaten dry with sugar, e into a sauce. Manna is also employed for the purpose of dis- more powerful cathartics. The dose of manna varies from 4–30 gm.).

lhur may be occasionally prescribed to advantage alone or in ation with the bitartrate of potassium, in order to soften the feces ord relief to constipated patients suffering from colitis, entero- ulceration, or stricture of the bowel, piles, or fissure. This s useful to keep the feces mushy, so that when evacuated they cause unnecessary pain to patients who have undergone some n upon the rectum.

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or nux vomica is, for the extract, ¼ to ½ gr. (

employed to relieve chronic habitual costiveness they should be partaken of at a low temperature, in order to obtain the benefit of the stimulating and tonic effect of the cold upon the intestinal mucous membrane and musculature; but when the constipation is of the spastic type, and caused by enterospasm, the water should be administered at a high temperature to soothe the bowel and cause it to relax.

One hears on all sides of the wonderful *cures* effected at the various *spas*, in most instances attributed to the virtues of their medicated waters. It is not wise, however, to concede that the benefit derived in such cases is due wholly to the therapeutic ingredients of the water; the managers of such resorts are entirely too clever to depend upon the virtues of their springs to heal the patients, consequently they modify the diet of their constipated clientèle, give them baths, massage, vibratory or electric treatment, require them to keep regular hours, and to take long walks in the open air and to drink several glasses of water during the day—all these factors favoring more copious and regular evacuations. Many of the patients are worn out from overwork and are extremely nervous through worry over their condition; this being the case, it is very easily understood how they rapidly regain their health when, in addition to the above advice and treatment, they are given a change of scenery and surroundings and a complete rest from their social and business engagements. In many instances the remarkable cure effected at the spring becomes a dismal failure shortly after the return of the patient to his usual pursuits and environments.

Saline cathartics and mineral waters are always contra-indicated in complete intestinal obstruction, in aggravated cases of fecal impaction, in certain acute inflammatory affections of the abdomen, and in old and feeble patients, who cannot withstand the drain consequent upon their use.

Very mild laxatives will suffice to secure the desired movements in many instances in persons who suffer *slightly* from constipation all the time and those who are troubled with an occasional attack of costiveness. The most reliable agents of this class are the *food laxatives* already mentioned, tamarind, manna, and sulphur.

Tamarinds, when taken at night, gently stimulate the bowel and cause a copious and easy evacuation the following morning. They act similarly to the fruit laxatives, and their aperient properties are due principally to the liberal percentage of the potassium salts of tartaric, citric, malic, and acetic acids contained in them.

This remedy ranks high with many persons who suffer moderately from constipation because of its agreeable taste, the slight discomfort which follows its administration, and the easy and natural evacuations it gives rise to. Tamarinds may be administered in shape of the confection of senna ʒj to ij (4.0–8.0 gm.), of which they constitute an important ingredient. Tamarinds also come in boxes in oblong pieces, the dose of which is one or part of one after each meal. Ordinarily they may be prescribed in from ʒj to viij (4.0–30.0 gm.).

Manna is another mild and popular laxative which may be prescribed effectually for the relief and cure of constipation in both adults and children. For the former, it is preferably given as the compound infusion of senna, f℥j to iij (30.0–90.0 cc.), and for children it may be administered in milk in combination with senna, be eaten dry with sugar, or made into a sauce. Manna is also employed for the purpose of disguising more powerful cathartics. The dose of manna varies from ʒj to ℥j (4–30 gm.).

Sulphur may be occasionally prescribed to advantage alone or in combination with the bitartrate of potassium, in order to soften the feces and afford relief to constipated patients suffering from colitis, enterospasm, ulceration, or stricture of the bowel, piles, or fissure. This remedy is useful to keep the feces mushy, so that when evacuated they may not cause unnecessary pain to patients who have undergone some operation upon the rectum.

A number of my patients have been entirely satisfied with the effects of from one to three lozenges taken before retiring. When prescribed as an *alterative*, sulphur may be given in 10 to 20 gr. (0.60–1.3 gm.) doses, but when as a laxative with molasses, from ʒj to ij (4.0–8.0 gm.) should be administered in order to obtain the desired result.

Tobacco smoking in some cases, through its action on the inhibitory nervous mechanism of the intestine, acts as a laxative, and under such circumstances in constipated subjects should not be abandoned.

Coffee when taken freely may have either a laxative or constipating action.

Occasionally it is advantageous, in the treatment of constipation, to reënforce the cathartic remedies with other medicines which will act as tonics, minimize discomfort, and lessen intestinal irritation; for these purposes ***nux vomica***, ***strychnin***, *physostigma*, and *belladonna* are the most frequently employed.

Nux vomica and *strychnin* can be happily combined with most laxatives and are a valuable aid to the treatment in patients who suffer from a weak appetite, deficient digestion, gastric and intestinal dilatation and displacement, or in those who are in a nervous or run-down condition. The dose for nux vomica is, for the extract, ¼ to ½ gr. (0.015–0.03 gm.);

for the fluidextract, 1 to 5♏ (0.06–0.3 cc.), and for the tincture, 5 to 20♏ (0.3–3 cc.).

Physostigma (*Calabar bean*) is a useful remedy in the treatment of chronic atonic constipation, alone or in combination with nux vomica, where there is marked gastric or intestinal dilatation, because of its tendency to increase glandular activity, strengthen the muscular fibers of the bowel, and promote peristalsis.

Constipated women at the change of life, who suffer from headache, vertigo, and flatulence, can be afforded much relief by the intelligent use of this remedy.

Physostigma may be administered as the extract, $\frac{1}{8}$ to $\frac{1}{4}$ gr. (0.008–0.015 gm.); the tincture, 5 to 30♏ (0.30–2.0 cc.), or in pill form (see Formulary).

Belladonna independently employed is of very little use in the treatment of chronic atonic constipation, but when this drug is used with neuromuscular tonic laxative medicines, like strychnin, aloes, and cascara sagrada, it renders valuable service in relieving pain, allaying intestinal irritability, arresting spasm of the bowel or sphincter muscle, and assisting to overcome the constipated state.

Belladonna is also to be relied upon in cases of constipation alternating with diarrhea, and to quiet the bowel in persons suffering from acute inflammatory diseases of the abdomen, mechanical obstruction, and chronic fecal impaction. This remedy tends to diminish the gastro-intestinal secretion, and for this reason should not be ingested until some time after eating.

The preparations of belladonna and their doses are as follows—viz., atropin, $\frac{1}{200}$ to $\frac{1}{40}$ gr. (0.0003–0.0015 gm.); extract, $\frac{1}{6}$ to $\frac{1}{4}$ gr. (0.01–0.015 gm.); tincture, 5 to 40♏ (0.3–2.6 cc.), and suppositories.

Arsenic, *phosphorus*, *phosphite of zinc*, the *hypophosphites*, ***Russell's emulsion***, *malt preparations*, and other nervous, muscular, and general tonics are indicated in the treatment of debilitated patients suffering from chronic costiveness, and should be employed in connection with other remedies destined for the regulation of the evacuations.

Oils are not employed nearly so frequently in the treatment of acute and chronic constipation as their merits entitle them to be.

The delayed or infrequent evacuations of patients suffering from chronic costiveness are, in many instances, due to a deficiency in the amount of water consumed or to the small amount of mucus secreted by the intestinal glands; under such circumstances the feces become abnormally dry, and because of this and the absence of a sufficient amount of mucus to lubricate the bowel, they are propelled downward with great difficulty and often tend to lodge in some part of the colon (cecum, transverse colon, sigmoid, etc.), where they form a fecal impaction.

I have succeeded in both relieving and curing a great many individuals affected with this type of constipation by advising them to drink a larger amount of water, to consume more butter, bacon, and cream, and to take from 1 to 2 tablespoonfuls of some preparation of *vegetable* or *mineral* oil one, two, or three times daily before meals, according to individual requirements. At other times I have found it necessary to reënforce this treatment by exercise, massage, electricity, or mechanical vibration.

The administration of oil promotes more copious and frequent evacuations by liquefying the feces, acting as a lubricant, and stimulating peristalsis. Oil contains *volatile fatty acids* in combination with glycerin, and when it comes in contact with *fat-splitting ferments* or with certain intestinal *bacteria*, part of the oil is split up into *free fatty acids* and *glycerin*, both of which stimulate intestinal motility.

In addition to the above-mentioned ways, oils, when taken by the mouth, are helpful in overcoming the constipated state, because through reflex stimulation they induce a more copious flow of the bile as well as the pancreatic juice.

In certain cases a considerable part of the oil is absorbed; this adds to the nutrition of debilitated individuals, and improves patients suffering from gastroptosis and enteroptosis through increasing the fatty deposits which support the displaced viscera.

The treatment of constipation by the administration of oil by mouth or in the form of enemata has the advantage over the majority of laxatives in that the amount of the drug can be gradually reduced without apparently affecting the frequency of the evacuations. For a number of years I have made extensive use of both vegetable and mineral oils in the curative treatment of chronic atonic constipation; of the former, I have found *olive*, *sweet almond*, and *cotton-seed oils* the most serviceable, while of the mineral oils, *liquid paraffin* and *vaselin*, *albol*, *albolin*, *benzoinol*, and *neutralol* have given the best results. While vegetable oils are effective, they are rather distasteful and are prone to cause nausea, loss of appetite, and slight gastric disturbances when administered in large amounts and for a considerable length of time, disadvantages which also obtain, but to lesser degree, when mineral oils are prescribed under similar conditions.

In my hands, with few exceptions, the mineral oils have caused the least trouble and given the most satisfactory results; of this group, neutralol and liquid paraffin have proved the most efficient. There is very little difference in the composition or action of the above-named so-called *mineral* or *hydrocarbon* oils, the basis of all being petroleum or Russian mineral oil and glycerin; the various names—albolin, benzoinol, neutralol, etc.—have been assigned to them for commercial purposes to give them an individual standing upon the market. These oils are bland and cause a minimum amount of irritation while in the stomach or intestine.

In order to relieve chronic fecal impaction, it is frequently advisable to prescribe several ounces of oil each day until relief is obtained.

When medicines are prescribed which discolor the stools, it is wise to prepare the patients for the results, otherwise they are likely to become alarmed when they notice that the evacuations are *black* after iron, bismuth, or charcoal, or of a *greenish cast* following a mercurial purge.

Medicated Enemata (Injections).—The technic for administering enemata has been already described in a previous chapter, as has been the value of hot and cold injections in the treatment of constipation. I now call attention to the different medicines which in the form of enemata have been used with more or less success in the treatment of this complaint to counteract intestinal toxins, heal pathologic conditions, and free the bowel of fecal accumulations which delay or prevent the stools

Ordinarily, medicated injections are not prescribed with a view to permanently curing costiveness, but with the idea of affording temporary relief for the patient by securing for him the much-coveted evacuation.

Rectal and colonic enemata are most serviceable agents when judiciously employed, and may be relied upon to secure an easy and almost immediate evacuation for infants or old and debilitated persons suffering from fecal impaction and acute diseases, but under other circumstances they do much harm and are to be condemned.

The simplicity and easiness with which an enema can be applied, lead many to practise this method of relieving the bowel in order to save time or the taking of cathartic remedies.

Many different chemicals have been employed in the form of enemata, with the object of bringing about an evacuation. Of these remedies the following, named in the order of their usefulness, have proved most satisfactory—viz., neutralol, olive and cotton-seed oils, soap, liquid vaselin and paraffin, glycerin, castor oil, starch, mucilage, flaxseed and linseed tea, slippery-elm water, normal salt solution, Carlsbad salt, and magnesium sulphate. Antiseptic and healing remedies may be added to the injections, according to the exigencies of the situation.

When soap-suds are used to bring about an evacuation, either green (liquid) or Castile soap should be employed, for the reason that cheap or hard toilet or laundry soaps contain ingredients which when injected into the bowel may be absorbed and cause the patient to break out in a scarlatinous, rubellar, or urticarial rash.

Under ordinary circumstances the injection of a few ounces of oil into the colon or rectum will bring about the desired passage through its action in stimulating peristalsis and the biliary and pancreatic flow, in softening the feces, and in lubricating the bowel. As a rule, one injection will suffice, but in aggravated cases, complicated by fecal impaction, repeated injections of a much larger amount of oil alone or combined with other remedies may be necessary in order to soften and dislodge the feces. Oils and other medicated enemata should be employed warm or hot in patients suffering from intestinal irritation, enterospasm, and mechanical obstruction, because of the soothing and relaxing effect which the warmth exerts upon the intestinal musculature.

Glycerin alone or diluted in water is a popular enema, both with physicians and the laity, with which to stimulate quick and easy evacuations when injected into the rectum in amounts varying from 1 to 2 ounces (32.0–64.0 cc.). Repeated injections of glycerin are objectionable because the drug soon loses its efficiency and keeps the lower bowel in a constant state of irritation.

Constipated patients, who also suffer from enteritis or colitis, can obtain much relief by washing the bowel out with a solution containing the natural or artificially prepared Carlsbad salt, while the lithemic or plethoric may be improved by injecting Watkin's formula, which contains 2 ounces (60.0 cc.) of magnesium sulphate and 1 ounce (30.0 cc.) of water, from day to day and for as long a time as may be required. Medicated solutions designed to bring forth an immediate evacuation should be resorted to only when the need is imperative, and the amount employed should not exceed 3 pints, because they tend to produce dilatation and paresis of the bowel; in most instances a few ounces will accomplish the same results as a much larger amount, while doing less harm.

Suppositories.—Glycerin and Castile soap suppositories, when placed in the rectum, facilitate the stools by stimulating peristalsis and softening the feces. Soap is an irritant and should not be permitted to remain for more than a brief period. I prefer 3-inch cone-shaped pieces of soap to suppositories, and the stool is excited by partly introducing this soap bougie a few times into the anal outlet, which serves to dilate the sphincter and to stimulate peristalsis. These cones are slippery, and care should be taken to prevent their gliding through the fingers and into the bowel. Soap or glycerin excite immediate evacuations, and when they fail to do so, they should be discarded for the less irritative and equally effective oil enemata.

CHAPTER XXVII

FORMULARY

For the convenience of the busy practitioner I have compiled several prescriptions which have been suggested by men of authority for the relief and cure of constipation in its different aspects.

First, I will give the formulæ of the more popular *dinner* or vegetable laxative pills, so frequently employed in the treatment of *chronic atonic constipation*, and then a few combinations of remedies which will be found useful in the handling of other types of constipation, either alone or complicated:

Vegetable Laxative Tonic (Dinner) Pills:

℞.	Fel bovis purif.	gr. j	0 06
	Ext. colocynthidis	gr. ¼	0 15
	Ext. hyoscyami	gr. ¼	0 15
	Ext. nucis vomicæ	gr. ¼	0 15

Misce et fiat pil. i.

Sig.—One at bedtime. (Gant.)

℞.	Pulv. aloini socotrinæ	gr. vij	0 4
	Pulv. rhei	gr. xxiv	1 5
	Ext. belladonnæ	gr. j	0 6

Misce. et fiat massa div. in pilulæ xii.

Sig.—One or two as may be required. (Da Costa.)

℞.	Resinæ podophylli	gr. ij	0 1
	Quininæ sulphatis Ext. aloini socatrinæ	āā gr. viij	0 5
	Fel bovis purif.	gr. xvj	1 0

Misce et fiat massa div. in pilulæ xvi.

Sig. One or two pills at night. (Goodell.)

℞.	Resinæ podophylli	gr. v	0 3
	Ext. physostigmatis Ext. nucis vomicæ	āā gr. viiss	0 5

Misce et fiat cum ext. et pulv. q. s. in pilulæ xxx.

Sig.—One pill twice daily. (Einhorn.)

℞.	Ext. rhamni purshianæ	ʒss	2 0
	Ext nucis vomicæ	gr. iv	0 2
	Ext. physostigmatis	gr. iij	0 2
	Ext. belladonnæ	gr. ij	0 1

Misce et fiat massa div. in pilulæ xx.

Sig.—One pill at night or night and morning. (Anders.)

℞. Resinæ podophylli	gr. iv	0 26
Ext. nucis vomicæ	gr. iv	0 26
Ext. physostigmatis	gr. iij	0 2
Ext. belladonnæ	gr. iv	0 26

Misce et fiat massa div. in pilulæ xx.

Sig.—One pill night and morning. (Hobart A. Hare.)

℞. Resinæ podophylli	gr. viij	0 5
Ext. aloes Ext. rhei	āā gr. xlvij	3 0
Ext. taraxaci	q. s.	

Misce et fiat massa div. in pilulæ xl.

Sig.—To be taken in the evening before going to sleep. One or four pills, according to individual requirements. (Nothnagel.)

℞. Ext. rhamni purshianæ	gr. ½	0 03
Ext. nucis vomicæ	gr. ¼	0 02
Ext. aloes	gr. ½	0 03
Ext. belladonnæ	gr. ⅙	0 01
Ext. gentianæ	q. s.	

Misce et fiat pil. i.

Sig.—Take once or twice daily. (Langwill.)

A. B. and S. Pill.—Universally popular:

℞. Aloini	gr. iij	0 2
Strychninæ sulphatis	gr. ⅓	0 02
Ext. belladonnæ	gr. ij	0 1

Misce et fiat massa div. in pilulæ xx.

Sig.—One pill at bedtime.

Habitual Constipation:

℞. Confectionis sennæ	℥j	30
Potassii bitartratis	ʒij	8
Sulphuris præcipitati Ferri subcarbonatis	āā ʒj	4
Melis depurati	q. s.	

Misce et fiat elect.

Sig.—Teaspoonful after meals. (J. F. Meigs.)

Constipation with Difficult Bile Secretion:

℞. Arseni trioxidi	gr. j	0 06
Hydrargyri chloridi corrosivi	gr. j	0 06
Pulv. ipecacuanhæ	gr. ij	0 1
Hydrargyri chloridi mitis	gr. xvj	1 0

Misce et div. in tab. xv.

Sig.—One or two tablets daily. (W. S. Porter.)

Obstinate Constipation of Women:

℞. Ferri et ammonii citratis	gr. xxx	2 0
Fl. ext. rhamni purshianæ	♏ xxx	2 0
Benzosulphinidi	gr. viij	5
Aquæ destillatæ	℥iss	45

Misce.

Sig.—Half a teaspoonful before each meal. (Lautau.)

A Nice Laxative for Habitual Constipation:

℞.	Vini aloes Fl. ext. rhamni purshianæ	āā ʒvj	24
	Elixir aromatici	q. s. ad ℥vj	180

Misce.

Sig.—Tablespoonful morning and evening. (SHOEMAKER.)

Constipation Complicated by Anemia and Nervousness:

℞.	Strychninæ	gr. ½	0·03
	Hydrargyri chloridi corrosivi	gr. ij	0·1
	Liq. potassii arsenitis	ʒij	8·0
	Acidi hydrochlorici diluti Tincturæ ferri chloridi Glycerini Elix. simplicis	āā ℥ss	15
	Aquæ destillatæ	q. s. ad ℥viij	240

Misce.

Sig.—Two teaspoonfuls in a little water half an hour after meals.

(MATTHEWS.)

Constipation with Hepatic Congestion:

℞.	Hydrargyri chloridi mitis	gr. ¼	0·015
	Resinæ podophylli	gr. $\frac{1}{12}$	0·005
	Sodii bicarbonatis	gr. j	0·06

Misce et fiat tab. i.

Sig.—Take one after each meal. (TUTTLE.)

Constipation of Pregnancy:

℞.	Ext. aloes	gr. xx	1·2
	Pulv. rhei	gr. x	0·6
	Ext. nucis vomicæ	gr. v	0·3
	Ext. taraxaci	gr. xxx	2·0

Misce et fiat massa div. in pilulæ xx.

(LUSK.)

Constipation with Hyperacidity:

℞.	Pulv. magnesiæ Pulv. rhei	āā ʒij	8·0
	Sodii bicarbonatis Sodii carbonatis Pulv. sacchari	āā ʒiv	15·0
	Olei menthæ piperitæ	q. s.	

Misce et fiat pulv.

Sig.—One-half to one teaspoonful in water two hours after each meal.

(ALLEN.)

Constipation with Gall-stones:

℞.	Hydrargyri chloridi mitis Ext. nucis vomicæ Ext. belladonnæ	āā gr. vij	0·4
	Resinæ podophylli	gr. j	0·06
	Ext. taraxaci	q. s.	

Misce et fiat massa div. in pilulæ l.

Sig.—One to three pills daily. (KAST.)

Constipation with Skin Eruptions:

℞.	Magnesii sulphatis	℥j	30
	Ferri sulphatis	gr. iv	0 2
	Sodii chloridi	ʒss	2 0
	Acidi sulphurici diluti	ʒj	4 0
	Infus. quassiæ	q. s. ad ℥iv	120

Misce.

Sig.—Tablespoonful half an hour before meals. (VAN HARLENGEN.)

Constipation with Anemia:

℞.	Ferri sulphatis Ext. aloes aquosæ	āā gr. v	0 3
	Ext. rhamni purshianæ	gr. xx	1 0
	Ext. belladonnæ Ext. nucis vomicæ	āā gr. iij	0 2

Misce et fiat massa div. in pilulæ xx.

Sig.—One after meals. (ARTHUR R. EDWARDS.)

Constipation with Intestinal Auto-intoxication and Anemia:

℞.	Aloini Ferri sulphas exsiccata Ext. belladonnæ alc. (B. P.) Ext. nucis vomicæ Pulv. ipecacuanhæ Pulv. myrrhæ Pulv. saponis	āā gr. ½	0 03

Misce et fiat in pil. i.

Sig.—One pill before each meal. (CLARK.)

Constipation with Flatulence:

℞.	Fl. ext. sennæ Syrupi zingiberis	āā ʒvj	22
	Tincturæ jalapæ	℥ss	15
	Tincturæ nucis vomicæ	♏xl	2

Misce.

Sig.—A tablespoonful in a wineglass of sugar water.

(BARKER.)

Constipation, Indigestion, and Flatulence:

℞.	Resinæ podophylli Euonymini Leptandrini	āā gr. v	0 3
	Ext. chiratæ	gr. xlv	3 0
	Creosoti	gr. x	0 6

Misce et fiat massa div. in pilulæ xx.

(HARE.)

Constipation with Deficient Secretion and Peristalsis:

℞.	Tincturæ physostigmatis Tincturæ nucis vomicæ Tincturæ belladonnæ flor.	āā ʒij	8

Misce.

Sig.—Thirty drops morning and evening for constipation.

(BARTHOLOW.)

Constipation with Atony and Intestinal Dilatation:

℞.	Ferri sulphas exsiccata Quininæ sulphatis	āā ℈ij	2 5
	Ext. nucis vomicæ Ext. aloes	āā gr. xij	0 7

Misce et fiat massa div. in pilulæ xl.

Sig. —One pill three times a day. (VAN BUREN.)

Spastic Constipation:

℞.	Ext. opii Ext. belladonnæ	āā gr. ¼	0 015
	Glycerini	gtt. v	0 3
	Olei theobromatis	q. s.	

Misce et fiat suppos. i.

Sig. One or two daily. (KAST.)

℞.	Ext. belladonnæ	gr. ⅓	0 02
	Ext. nucis vomicæ	gr. ¼	0 015
	Ext. colocynthidis comp.	gr. iij	0 2
	Sodii benzoatis	gr. vj	0 4

Misce et fiat massa div. in pil. ii.

Sig.- Repeat as often as may be required. (W. HANNA THOMSON.)

Constipation with Intestinal Catarrh (Carlsbad Salt Composition):

℞.	Sodii sulphatis	℥v	153
	Sodii bicarbonatis	℥ij	61
	Sodii chloridi	℥j	30

Misce et fiat pulvis.

Sig.- A teaspoonful in a tumbler of hot water an hour before breakfast.

Reliable Laxative Pill for Occasional Use:

℞.	Ext. colocynthidis comp.	gr. j	0 06
	Aloes socotrinæ	gr. ij	0 1
	Ext. hyoscyami	gr. ⅓	0 02
	Ext. nucis vomicæ	gr. ¼	0 015

Misce et fiat massa pil. i.

Sig. Dose, one such pill at night. (WILLIAM GILMAN THOMPSON.)

Constipation with Intestinal Fermentation:

℞.	Ext. aloes	gr. vj	0 3
	Pulv. rhei	gr. vj	0 3
	Benzosolis	gr. ix	0 5
	Ext. hyoscyami	gr. vj	0 03

Misce et div. in caps. xii.

Sig.—One after meals. (STUCKY.)

Constipation with Fecal Impaction:

℞.	Aquæ ferv. vel olei	Oj	475
	Fel. bovis purif.	ℨij	8
	Glycerini	℥iv	120

Misce et fiat inject.

Sig.—Inject the entire amount and repeat if necessary. (GANT.)

Acute Constipation:

℞.	Pulv. rhei comp. Sodii sulphatis	āā ℥j	30
	Sodii bicarbonatis	ʒij	8

Misce et fiat pulv.

Sig.—One to one and one-half teaspoonfuls at bedtime. (Gant.)

Mild Constipation (Compound Infusion of Senna):

℞.	Infus. sennæ comp.	♏c	6
	Mannæ	gr. cxc	12
	Magnesii sulphatis	gr. cxc	12
	Fœniculi pulv.	gr. xxxij	2
	Aquæ bull.	ʒxxij	80
	Aquæ fort. q. s. ad	ʒxxviij	102

Misce.

Sig.—Four ounces or more at night.

Cathartic Enema (Constipation and Impaction):

℞.	Magnesii sulphatis	℥ij	62
	Olei terebinthinæ	℥ss	15
	Glycerini	℥j	30
	Aquæ destillatæ q. s. ad	℥iv	120

Misce.

Sig.—Inject. (Noble.)

Constipation of Old Age.—Usually effective for years:

℞.	Pil. colocynthidis comp. Pil. rhei comp.	āā gr. j	0 06
	Ext. hyoscyami	gr. ss	0 03

Misce et fiat in pil. i.

Sig.—One before dinner.

Chronic Constipation (Cathcart's Pill):

℞.	Ext. colocynthidis comp.	gr. ss	0 3
	Aloini	gr. ⅛	0 008
	Ext. belladonnæ Ext. nucis vomicæ	āā gr. ¼	0 015

Misce et fiat in pil. i.

Sig.—One or two at bedtime.

Chronic Constipation.—To stimulate the liver and motor functions of the intestines:

℞.	Ext. colocynthidis Ext. nucis vomicæ	āā gr. ¼	016
	Ext. hyoscyami alc.	gr. ½	032

Misce et fiat pil. i.

Sig.—Take one at night. (Kemp.)

Very Obstinate Constipation.—Compound cathartic pill:

℞.	Ext. colocynthidis comp.	gr. i⅓	0 08
	Hydrargyri chloridi mitis	gr. j	0 06
	Resinæ jalapæ	gr. ⅓	0 02
	Gambogiæ	gr. ¼	0 015

Misce et fiat in pil. i.

Sig.—Dose, one to three pills at night. (U. S. P.)

Vegetable Cathartic Pill (Colocynth):

℞.	Ext. colocynthidis comp.	gr. j	0 06
	Resinæ jalapæ	gr. ⅓	0 02
	Ext. hyoscyami	gr. ½	0 03
	Ext. leptandrinæ	gr. ¼	0 016
	Resinæ podophylli	gr. ¼	0 016
	Olei menthæ piperitæ	gtt. ¼	0 016

Misce et fiat in pil. i.

Sig.—One to three pills at night. (U. S. P.)

Constipation and Inflamed External Hemorrhoids:

℞.	Liq. plumbi subacetatis	ʒiv	15
	Tinctura opii	ʒiiss	9
	Aquæ destillatæ	℥iv	120

Misce.

Sig.—Apply constantly (ice cold) by means of cotton or gauze. (Gant.)

Constipation and Thrombotic Hemorrhoids:

℞.	Ung. stramonii	ʒss	2
	Ung. belladonnæ	ʒiiss	9
	Ung. acidi tannici	℥ss	15

Misce et fiat unguent.

Sig.—Use freely inside and outside the anus. (Gant.)

Constipation Induced by Anal Fissure:

℞.	Hydrargyri chloridi mitis	gr. vj	0 4
	Ext. belladonnæ	gr. viij	0 5
	Ext. opii	gr. vj	0 4
	Petrolati	℥j	30 0

Misce et fiat unguent.

Sig.—Apply morning and night. (Gant.)

Constipation and Very Painful Sphincteralgia:

℞.	Cocainæ hydrochloridi	āā gr. j	0 06
	Ext. belladonnæ		
	Morphinæ sulphatis	gr. ij	0 1
	Olei theobromatis	q. s. ad	

Misce et fiat massa div. in suppos. viii.

Sig.—Insert one, and repeat in three or four hours if needed. (Gant.)

Constipation and Inflamed Hemorrhoids:

℞.	Liq. magnesii carbonatis	℥ss	14
	Potassii bicarbonatis	℈j	1
	Syrupi sennæ	ʒij	8
	Spir. ætheris	ʒss	2
	Aquæ destillatæ	q. s. ad ℥ij	60

Misce.

Sig.—Take in the morning. (ALLINGHAM.)

Constipation with Protruding Internal Hemorrhoids:

℞.	Morphinæ sulphatis	gr. viij	0 5
	Hydrargyri chloridi mitis	gr. xij	0 8
	Adepis lanæ	℥j	30 0

Misce et fiat unguent.

Sig.—Apply freely to tumors and lower rectum night and morning. (GANT.)

Constipation and Irritable Internal Hemorrhoids:

℞.	Morphinæ hydrochloridi	gr. x	0 6
	Ext. belladonnæ Acidi tannici	āā ʒj	4 0
	Petrolati Adepis lanæ	āā ℥j	30 0

Misce et fiat unguent.

Sig.—Apply to tumors frequently. (BAY.)

In Painful Defecation:

R.	Ung. hydrargyri	gr. ij	0 1
	Ext. belladonnæ	gr. j	0 06
	Bismuthi oxidi	gr. iij	0 2
	Olei theobromatis	q. s. ad	

Misce et fiat suppos. i.

Sig.—Use one or two daily. (MURRAY.)

Constipation with Rectal Irritability:

℞.	Sulphuris depurati Pulvis sodii tartratis	āā ʒiiss	10
	Fol. sennæ pulv.	gr. lxxx	5
	Fruct. cardamomi pulv.	gr. xl	2 7
	Syrupi rhamni cathartici	q. s.	

Misce et fiat elect.

Sig.—One teaspoonful morning and night. (EWALD.)

Constipation of Infants and Children:

℞.	Mannæ electa	ʒvj	23
	Magnesii carbonatis Sulphuris lot.	āā ℥iss	46
	Mellis depurati	ʒvj	23

Misce et fiat elect.

Sig.—One-half to two teaspoonfuls, according to age.

℞.	Mannæ optimi	ʒj	4
	Syrupi simplicis	℥ss	15
	Aquæ cinnamomi	q. s. ad ℥j	30

Misce.

Sig.—A teaspoonful three times a day for infants.

Constipation of Infants and Children:

℞.	Magnesii sulphatis	ʒij	8
	Acidi sulphurici diluti	gtt. v	3
	Syrupus aurantii	ʒiij	12
	Aquæ carvi	ʒv	18

Misce.

Sig. Two teaspoonfuls hourly until bowels move. (West.)

℞.	Fl. ext. glycyrrhizæ	ʒij	8
	Fl. ext. rhamni purshianæ	ʒv	18
	Aquæ destillatæ q. s. ad	℥ij	60,

Misce.

Sig.—One teaspoonful for children from three to five years of age.

℞.	Syrupi rhei aromat.	℥ss	15 00
	Ext. fl. rhamni purshianæ	ʒiij	12 00
	Glycerini q. s. ad	℥ij	60 00

Misce.

Sig. One teaspoonful daily for a child three to five years of age. (Pisek.)

℞.	Pulv. glycyrrhizæ comp.	℥j	30,00

Sig. One teaspoonful at night for a child two to five years of age. (Gant.)

℞.	Hydrargyri chloridi mitis	gr. j	064
	Sodii bicarbonatis	gr. x	640

Misce et fiat pulv. et div. in chart. No. x.

Sig. —One every fifteen minutes until desired amount is taken. For infants and young children. (Gant.)

℞.	Sodii phosphatis	gr. xxiv	1 6
	Syrupus mannæ	℥iiss	76
	Aquæ anisi q. s. ad	℥iij	92,

Misce.

Sig.—A teaspoonful thrice daily for a child under one year.

℞.	Ext. belladonnæ	gr. i⅛	0|075
	Pil. aloes et myrrhæ	gr. ix	0|6
	Olei carvi	gtt. ij	0|12

Misce et fiat massa div. in pilulæ vi.

Sig. —One pill at bedtime for a child aged six. (Goodhart and Starr.)

℞.	Pulv. rhei	gr. ij	0|12
	Sulphuris lotus	gr. iv	0|26
	Sodii phosphatis	gr. xx	1|3
	Olei menthæ piperitæ	gtt. v	0|3

Misce et fiat tab. No. xx. (compress).

Sig. One tablet one to three times a day for children over one year. (Powell.)

℞.	Fl. ext. rhei	♏xvj	1 0
	Fl. ext. ipecacuanhæ	♏iij	0 2
	Sodii bicarbonatis (bicarbonas)	gr. xxxij	2 0
	Gylcerini	ʒvj	23
	Aquæ menthæ piperitæ	℥ij	60

Misce.

Sig.—One-half to one teaspoonful two or three times daily. (Squibb.)

CHAPTER XXVIII

TREATMENT OF THE COMPLICATIONS AND CONSEQUENCES OF CONSTIPATION

In the handling of patients suffering from chronic constipation, naturally the most important thing to do is to secure for them, at the earliest possible moment, regular and natural evacuations; but it is not always good policy to accomplish this at the expense of great suffering.

On account of distressing and dangerous complications which have arisen during the treatment of constipated individuals, and the discomforts and suffering caused by the symptoms and sequelæ of constipation, I have on many occasions found it expedient to *temporarily or permanently modify, completely change, or stop the plan of treatment* originally outlined in order to relieve these disturbances. In the majority of cases such complications and consequences can be successfully combated without interfering with the systematic treatment; but when they become very distressing or dangerous or when they are aggravated by remedial measures directed to the relief of the costiveness, this treatment should be temporarily interrupted and substituted by measures which will relieve the secondary manifestations.

Usually, the modified or interrupted treatment may be resumed before long, but when it becomes evident that the remedial agents again start up the complications or otherwise aggravate the patient's condition, they should be permanently discarded for other and more readily tolerated therapeutic procedures.

In both children and adults it is frequently necessary to modify the *diet*, select it with a view to increasing the number of evacuations, and to prescribe some simple remedy to relieve disturbances of the stomach and intestine caused by the food.

Now and then stimulants, nourishing foods, hydrotherapy, strychnin, arsenic, hypophosphates, Russell's emulsion, or iron (Blauds pills) may with advantage be added to other features of the treatment of *aged, debilitated*, and *anemic patients*, to improve digestion, tone up relaxed tissues, and increase the quality and volume of the circulating fluids.

When *neurasthenia, malaise, headache, melancholia, insomnia*, and *skin affections* resulting from *fecal toxemia* become troublesome, it is advisable to cleanse and purify the bowel with the aid of the intestinal antiseptics —salol, beta-naphtol, aspirin, or calomel, copious water drinking, frequent colonic flushings—or when the trouble is due to the presence of putrefying foods and other toxins which cause dangerous manifestations, hydragogue cathartics may be prescribed in order thoroughly to wash out the bowel and expel them. To relieve the *pain* and *nervousness* and to *promote sleep,* one may resort to *light* friction-massage, galvanism, hot baths or applications, and, when necessary, to antikamnia, aspirin, veronal, trional, the bromids, and opiates. I rarely need drugs to relieve the toxic symptoms, but when I do, they are administered in small doses and discontinued at the earliest possible moment, because their persistent use materially interferes with the treatment. *Chlorosis* and *anemia* arising from auto-intoxication which cannot be relieved by intestinal lavage, call for iron, salol, calomel, the salicylates, and other preparations, according to the indications present.

Not infrequently, *dark brown blotches* or *pimples* appear upon the face, or some *skin eruption* occurs on other parts of the body, in chronically constipated patients suffering from *intestinal auto-intoxication.* Such unwelcome and annoying manifestations usually depart after the evacuations have become copious and regular, but in the meantime their disappearance can be hastened by the administration of preparations of either sulphur or senna. It sometimes happens, while pursuing the drugless treatment for constipation, that the patient will become *bilious* and require a diet containing more fat or a few small doses of calomel and soda, podophyllin, blue mass, or other biliary, pancreatic, or intestinal stimulant, in order to relieve the discomforts arising from the attack and to restore the feces to their normal color and consistence.

Flatulence and *colic* constitute two of the most common and distressing complications of costiveness, and frequently it is necessary to adopt special means to relieve and prevent them. When they are caused by the blocking up of the bowel with a fecal impaction, quick relief is to be had by softening and washing out the feces with frequent and copious high enemata of water, soap-suds, or oil containing a small amount of turpentine. When the fecal accumulations are multiple and hard from long retention, this treatment should be reënforced by water drinking, large doses of olive, mineral, or castor oil, gentle massage to break up and dislodge the fecal masses, and hot fomentations to relax the bowel when there is muscular rigidity or enterospasm. Flatulence or colic arising from excessive fermentation which cannot be prevented or alleviated by dieting, friction, massage, and galvanism, can be satisfactorily controlled in most instances by the administration of liberal doses of charcoal, asafetida, or capsicum, alone or in combination, or Fowler's solution with nux vomica, or chamomile tea enemata, remedies which should be discontinued at the earliest possible moment.

Excessive *gastric secretion* (*hypersecretion* and *hyperchlorhydria*) very often causes or complicates chronic constipation. In such cases the regularity of the evacuations cannot be reëstablished until the gastric condition has been corrected. This class of sufferers should be advised to avoid smoking, alcoholic drinks, and highly seasoned food, which are known to increase the acidity of the stomach, and to drink a glass of cold Carlsbad water half an hour before each meal. In addition to this treatment, they should be required to take such reliable antacids as the bicarbonate of soda or dry magnesium, and in aggravated cases to combine these remedies with belladonna.

Individuals having a *weak digestion* due to *atony* of the stomach should be given strychnin and endogastric faradization, and should be requested to eat more frequently but sparingly while undergoing the treatment planned to relieve their costiveness. When there is a *low acidity* (*hypo-acidity*) or a deficiency of *hydrochloric acid* (achylia), this acid should be supplied in the necessary amounts ($\frac{2}{10}$ of 1 per cent.).

Gastric catarrh rarely causes or complicates constipation, but when it does, lavage of the stomach assists in the correction of both the catarrhal and the constipated state.

Catarrh of the small intestine, associated with constipation, is most satisfactorily relieved by the administration of the "salines," especially Carlsbad and Vichy water or their salts, and by intestinal *lavage*, where the same remedies are employed.

For the relief of *gastroduodenal* catarrh, sodium phosphate in combination with sodium benzoate, salicylate, or sulphate will be found effective (Solomon Solis Cohen).

In costiveness resulting from *gastric* and *esophageal stricture*, careful attention to diet and intestinal lavage gives the most satisfactory results aside from surgical procedures.

When there is a *fecal concretion in the bowel*, the hardened feces should be softened by the internal administration of aloes, sulphur, cascara, or tamarinds, to enable them to pass the obstruction. If in spite of this treatment they show a tendency to reaccumulate before expulsion, they should be dislodged and washed out by copious enemata.

Constipation complicated by *colica mucosa* is often accompanied by *enterospasm*, which temporarily obstructs the bowel completely and induces the most intense suffering; such attacks can be quickly dissipated by warm-water drinking, copious high warm oil injections, and intestinal lavage, to dislodge and bring away the collection of irritating mucus, and, when necessary, soothing hot applications should be made to the abdomen, and an opiate, or belladonna, given to relieve pain and cause a relaxation of the contracted musculature, in order that the feces and flatus may escape; under such circumstances, cold drinks, baths, and douches should *not* be employed, because they add to the irritation and aggravate the condition of the patient.

In advanced cases of *gastroptosis* and *enteroptosis*, the saline cathartics and a coarse diet are inadvisable because they increase the trouble; much benefit, however, is to be derived from nourishing food which leaves a small residue, the rest-cure, and physicomechanical therapeutics, together with the proper support to the viscera by means of a belt-corset or by readjusting and fixing the displaced viscus to its natural position by operation (colopexy).

When *syphilis*, *appendicitis*, *peritonitis*, *typhoid fever*, *intestinal obstruction*, *ulceration of the stomach* or *intestine*, or *acute gastritis* or *colitis* develop, the symptomatic measures should at once be substituted by systemic treatment in all types of constipation, for the reason that the coarse diet and physical measures practised to increase the number of stools will, under the circumstances, do but little good and cause the patient much discomfort.

In the treatment of costive patients who suffer from *heart failure* or *palpitation*, physical measures and a bulky diet are also contra-indicated, because too dangerous in the first-named case, and in the latter adding to the discomfort by inducing distention of the stomach and shortness of breath.

The management of chronic constipation in women is especially difficult during *pregnancy*. While this condition is present I am accustomed to do what I can toward securing regular daily evacuations, but make no attempt to effect a cure until after parturition, for the reason that under the circumstances the employment of heavy massage, mechanical vibration, electricity, and bodily movements does little good and may bring on premature labor. To keep the bowels open I rely principally upon enemata, cascara sagrada, and vegetable pills containing podophyllin or rhubarb, because they procure the most regular, easy, and natural evacuations. Purgatives I never give and "salts" (sodium and magnesium) are prescribed only in exceptional cases, where flushing of the bowel is indicated, because of their tendency to produce nausea, griping, and an unnecessary number of fluid stools. When there is recurring fecal impaction, resulting from pressure on or angulation of the gut induced by the gravid uterus, the fecal accumulations should be removed from time to time by means of the measures previously elsewhere recommended for this purpose.

Aloes and myrrh is an agreeable and effective combination to prescribe for the relief of *dysmenorrhea* in constipated women, but when they are troubled with *amenorrhea*, aloes should be employed in combination with some preparation of iron.

During *menstruation*, massage, vibration, and *cold* hydrotherapeutic measures should be interrupted, because they add to the discomfort of the patient and may arrest the menstrual flow. The evacuations should, therefore, be secured temporarily by the aid of pills or enemata.

Women suffering from costiveness, digestive disturbances, headache, vertigo, and flatulence during the change of life can be entirely relieved or made more comfortable by giving them a combination containing physostigma and nux vomica.

For those constipated individuals who suffer from *nephritis*, frequent hot colonic irrigation will prove beneficial because of its diuretic action, while calomel and other preparations of mercury are contraindicated because of their tendency to aggravate the trouble through their effect upon the excreting tissues of the kidney.

Gout and *rheumatism* are complications which materially interfere with the treatment because they may incapacitate the abdominal and other muscles, prevent the patient from exercising in the open air, necessitate a change in the diet, and for their relief require medicines which not infrequently tie up the bowel.

These complaints can be relieved or cured by bandaging, galvanism, and the high-frequency current, singly or combined with the copious drinking of lithia water and the taking two or three times daily of from 10- to 15-gr. doses of the salicylates to shorten the attack.

Patients suffering from *arterial sclerosis* should, besides iodin, be given mild tonic and saline laxatives when necessary; but in the handling of these patients hot and cold baths and irrigations, massage, mechanical vibration, and other measures which favor an increase in the blood-pressure are to be carefully avoided.

In cases of *cirrhosis of the liver*, morning doses of ʒj to iss of Carlsbad salts, sodium sulphate, or phosphate will render good service.

Hepatic colic and the discomfort and pain incident to *lead-poisoning*, *neuralgia*, *neuritis*, and *reflex disturbances* of the *genital organs* require treatment similar to that advised for the relief of enterospasm, except where there is an associated pelvic inflammation, when a mixture composed of 4 oz. (120.0 cc.) of water, 2 oz. (60.0 cc.) of magnesium sulphate, and 1 oz. (30.0 cc.) of glycerin should be occasionally injected into the bowel, in order to reduce the inflammation and allay the irritation in the adjacent structures and organs. Constipated persons undergoing treatment who suffer from *diabetes*, and those who are attacked by *fevers* which exhaust the supply of water to the intestine, are frequently troubled with dry, nodular fecal evacuations; such individuals in order to overcome this difficulty should be advised to drink freely of water, to eat fruit, and to consume a liberal amount of cream, butter, and bacon with their meals, and to take rather large doses of olive oil, liquid paraffin, regulin (agar-agar), and cascara, in order to lubricate the intestinal canal and soften the feces, so that they may be propelled downward with greater frequency and less discomfort. When this does not suffice, water or oil, alone or containing ox-gall or glycerin, should be thrown well up into the bowel, in order to facilitate the evacuations.

In *lithemic* and *plethoric* individuals, laxative mineral waters in considerable quantities are of value in relieving these conditions, and may be administered to afford temporary relief, but should be discarded as soon as practicable because they materially interfere with the permanent cure of the constipation.

When *proctitis*, *hemorrhoids*, and *fissure* develop or become sufficiently severe to excite *spasmodic contractions of the levatores ani* and *sphincter muscles*, causing much pain and interfering only with the passage of the feces, they demand individual treatment.

The *muscular spasms* and the suffering incident thereto can usually be arrested by the application of hot fomentations or the injection at short intervals of hot water or oil into the rectum; but when these fail, suppositories containing morphin and belladonna may be relied upon to relieve the situation until the underlying affection has been cured by means of the therapeutic procedures described elsewhere.

Finally, it is extremely difficult to accomplish satisfactory results, in so far as a cure is concerned, in *very old people* and persons who are *run down* and exhausted from *chronic invalidism* and prolonged suffering, and those afflicted with *senile atony*, *general paralysis*, *locomotor ataxia*, or other *incurable* diseases of the *brain* or *spinal cord*, which directly or indirectly influence the intestinal mechanism and the act of defecation. For the relief of such sufferers, a long and arduous treatment by means of hydrotherapy, vibration, massage, and electricity is unwise because it uses up the patient's strength, involves much discomfort, and does not relieve or cure his costiveness. In such cases I have succeeded fairly well in keeping the bowel open and procuring easy and copious evacuations by the aid of cascara sagrada, tamarinds, a vegetable pill, or liberal doses of oil, and when the feces accumulated in the rectum, they were removed from time to time by warm water or oil injections.

Colitis, sigmoiditis, and **proctitis,** which aggravate the constipated state, require individual attention while other measures are being employed to increase the frequency of the stools. Usually a catarrhal inflammation of the intestine and, more especially, the colon can be improved by regulating the diet and washing out the bowel daily with Carlsbad salts or with a weak solution of silver nitrate, ichthyol, boric acid, hydrastus, or other soothing, stimulating, or astringent solution.

When the mucosa is ulcerated and the feces contain pus and blood, the strength of the solution and the frequency of the irrigations should be increased.

In cases where the bowel is raw and irritable, much can be done to alleviate the condition by injecting daily into the intestine a few ounces of vegetable or mineral oil containing a small quantity of bismuth.

In case the above treatment proves unsatisfactory, the mucous membrane may, after being cleansed by warm water and soda, be dusted over with a mixture of magnesium and tannin, bismuth, subnitrate, or xeroform, after the plan of Rosenberg (*Arch. f. Verdauungskrankh.*, 13, 1907), who claims better results from the dry or powder treatment because it remains in contact with the diseased surfaces longer than the irrigating fluid. I have tried both the wet and the dry treatment, but prefer the former, because the solution can be made to reach all parts of the colon, while the powder cannot, even with the aid of the sigmoidoscope, compressed air, and the best insufflator, and further, because I have known the powder to become caked and excite considerable irritation.

Colitis and sigmoiditis, accompanied by extensive ulceration, which will not heal under the treatment already given, require effective through-and-through irrigation, such as can be accomplished only by ***appendicostomy***, ***simple cecostomy***, or the author's ***cecectomy***, with an arrangement for irrigating both the large and the small intestine.

When constipation or obstipation is induced or made worse by ***colica mucosa*** and its accompanying enterospasm, an entirely different plan of treatment must be instituted. This class of patients does better when a diet is prescribed which leaves a bulky residue to excite peristalsis, while liberal doses of olive oil or liquid paraffin are administered by mouth or per rectum to soften the evacuations, lubricate the intestine, and soothe the mucosa, with hot fomentations to the abdomen, and opium and belladonna internally, to allay irritation and lessen or arrest attacks of enterospasm. Von Noorden has shown that colica mucosa subsides when the enterospasm ceases and the constipation has been cured.

Now and then colitis and sigmoiditis, when chronic, induce a pericolitis or perisigmoiditis, which in turn may lead to circumscribed or general peritonitis, the formation of binding adhesions, diverticula, abscess, persistent obstipation, fecal impaction, and conditions which cannot be satisfactorily relieved except by opening the abdomen and dealing with them directly.

CHAPTER XXIX

TREATMENT OF SPASTIC CONSTIPATION

THE current medical literature affords comparatively little information concerning the treatment of spastic constipation. This hiatus is surprising to those who appreciate the frequency with which this type of costiveness is encountered and the ease with which it can be relieved and cured.

In order to refresh the mind of the reader as to the etiology of this complaint, I will briefly state that in spastic constipation the delayed evacuations are due to enteric spasms. Here there is a simultaneous contraction of both the *circular* and *longitudinal* muscular fibers, excited by a nervous influence from without or a local irritation within the intestine, such as a collection of tenacious mucus, ulceration, fecal impaction, foreign bodies, a mechanical obstruction, violent poison, or disease in neighboring organs.

Spastic constipation calls for a mode of treatment radically different from that of chronic atonic costiveness; in the handling of the former, means should be taken to prevent and relieve muscular contractions of the bowel, while in the latter it is desirable to stimulate them.

In the treatment of spastic constipation the first endeavor should be to relieve the enterospasm, and in so doing permit the escape of flatus, arrest colicky pains, allow the fèces to escape and thereby lessen toxic manifestations, and after this has been accomplished, everything possible should be done to remove the source of irritation and prevent a recurrence of the attacks.

Owing to the remarkably soothing and relaxing action of heat upon the abdominal and intestinal musculature, I have been enabled in most instances to relieve enteric spasm by the aid of hydrotherapy, galvanism, or the therapeutic lamp (Fig. 142). I employ the water simultaneously in three different ways, namely, the patient is required to drink copiously of hot water (105°–110° F.), except when it nauseates, while hot fomentations are continuously applied to the abdomen over the affected region and the intestine is being persistently irrigated with very hot water (110°–130° F.). By this plan of treatment the most severe attack of enterospasm can, under ordinary circumstances, be quickly relieved, and not infrequently the patient, through the sedative effect of the hot water, drops off into a sound, refreshing sleep.

Hot olive oil, sweet almond, cotton-seed, or one of the mineral oils, such as neutralol, albolene or liquid paraffin, starch-water or flaxseed tea, with or without belladonna and opium, may be substituted for the hot-water irrigation, when injected well up into the colon. Of the remedies named, oil preparations are preferable because they are more soothing in character, and facilitate the downward journey of the feces on account of their lubricating properties. These, as well as castor oil, may be advantageously administered by the mouth, but the latter should be discontinued as soon as the attack has been relieved because of its secondary constipating effect.

Fig. 142.—Robinson's therapeutic lamp.

The oils may be used in doses varying from 1 to 4 ounces, but when employed as enemata, they may be used in amounts ranging from 6 to 16 ounces, or even more.

By the intelligent use of oils in this class of cases a great deal can be accomplished toward both relief and cure, without causing any discomfort or endangering the life of the patient.

The oil preparations are particularly serviceable in spastic constipation, for the reason that they are bland and lessen enteric spasm, soften the feces, lubricate the bowel, and stimulate the flow of bile and pancreatic juice.

Drastic cathartics are always contra-indicated because they add materially to the patient's pain by exciting violent and prolonged peristalsis, which is powerless to propel the feces through the contracting segment of the gut. When occlusion appears to be complete, reliance should be placed upon heat, galvanism, and belladonna to open the bowel, but when the obstruction is only partial and oils fail to secure an evacuation, mild laxatives will usually bring the desired stool. Laxatives employed either for the relief or cure of spastic constipation should be chosen with the greatest care, and only those should be selected which are devoid of irritative properties and mildly stimulate muscular and glandular activity; for this purpose, I know of no remedies which will give greater satisfaction than cascara sagrada, rhubarb, and colocynth, administered in small doses and as frequently as may be necessary to obtain the end.

Now and then intestinal irritability can be relieved by means of frequent and lengthy applications of galvanism; in this class of cases the galvanic current is applied by placing one electrode over the middle of the spine and the other over the contracted gut, or by placing one over either the spine or abdomen and the other (irrigating electrode, Fig. 135) in the rectum. Galvanism has a direct and a reflex influence both upon the musculature and nervous mechanism of the bowel, in consequence of which it allays irritation and soothes the intestine.

In very obstinate cases of spastic constipation, where enterospasm occurs at short intervals, lasts for a considerable time, and causes much suffering, and the therapeutic measures already suggested for the relief of this condition fail, belladonna, hyoscyamus, or an opiate, alone or in combination, should be prescribed in liberal doses in order to relieve the situation. Under such circumstances belladonna is the remedy *par excellence*, no matter if it be administered by the mouth, by hypodermic injections, or in the shape of a suppository or enema.

Proctologists have for years recognized the great value of this remedy, alone or in combination with opium, in cases of sphincteric spasm, to arrest the contractions of the anal muscle and to relieve the intense coincident pain. This combination, when employed for the relief of spastic constipation, not only allays irritation and suffering, but through the influence of the belladonna upon the nerves produces an inhibitory effect upon the intestinal musculature, which results in a relaxation of both the circular and longitudinal layers to such an extent that they permit the bowel contents (feces and flatus) to escape, thereby relieving the patient. When for any reason it is desirable, atropin may be substituted for belladonna, or the non-medical measures above referred to may be used in conjunction with this remedy. Belladonna may be administered every two or three hours until the patient is relieved or until objectionable constitutional effects manifest themselves. This drug may be employed in the treatment of spastic constipation in the following forms and doses: The tincture, 5 to 20♏ (0.3–1.2 cc.); the extract, 1/8 to 1/4 gr. (0.008–0.016 gm.); the fluidextract, 1 to 3♏ (0.06–0.2 cc.), and in cocoa-butter suppositories containing from 1/8 to 1/4 gr. (0.008–0.016 gm.) of the extract of belladonna, in combination with an equal amount of morphin.

Hyoscyamus, when administered in the form of the tincture in 10 to 40♏ (0.60–2.60 cc.) doses, three times daily, will in many cases induce prompt recovery from attacks of spastic constipation; but quicker and more lasting results are obtained from the administration of a pill containing from 1/2 to 3 gr. (0.03–0.2 gm.) of the extract of hyoscyamus and from 1/8 to 1/4 gr. (0.008–0.016 gm.) of the extract of belladonna.

In a few instances I have observed more or less relief to follow the taking of various kinds of hot drinks and medicines, such as ginger and capsicum, which create sensations of warmth in the stomach and intestine, but I do not regard them as being remedies in this class of affections.

Just as soon as an attack of enterospasm has been relieved, means should be taken at once to remove the source of the irritation, and in this way permanently cure the spastic constipation. When the trouble is due to nervousness or nerve irritation, general faradization, strychnin in small doses, and Fowler's solution of arsenic, together with applications of heat externally and of oil by the mouth and in the form of enemata, will gradually effect a cure.

Now and then a case will be encountered where enterospasm is excited as a result of some poison taken with the food, which sets up a most violent irritation within the bowel; under such circumstances, calomel or one of the hydragogue cathartics may be prescribed, in order to minimize its effects or expel it, after which the soothing treatment already recommended should be instituted at once.

In neurasthenic and hysteric patients the valerianate of zinc will prove a useful remedy, and for those who suffer from discomfort induced by large and frequent accumulations of gas, asafetida administered three times daily in doses ranging from 6 to 10 grains will usually afford the needed relief.

When the delayed evacuations are dependent upon mucous colitis, the constipation can be made to disappear by prescribing a coarse or bulky diet containing a liberal amount of fats, the intelligent use of oils, and, in aggravated cases, by the daily administration of belladonna.

Enteric spasm excited by an ulceration of the bowel can be best relieved and prevented by frequently irrigating the sores with antiseptic and stimulating solutions.

Spastic constipation resulting from direct or reflex irritation dependent upon a foreign body, stricture, or tumor of the bowel, or due to partial or complete occlusion of the intestine, induced by an angulation, flexure, or pressure upon the gut from without, usually requires correction by surgical interference.

Much can be accomplished in affording temporary relief to this latter class of sufferers by hydrotherapy, galvanism, gentle massage, hot injections, and mild cathartics, alone or in combination with belladonna. The temporary character of the relief should be emphasized to the patient, and he should be informed that to obtain a permanent cure it is necessary that he submit to a surgical operation. On several occasions, while treating persons suffering from chronic atonic constipation, I have observed them to suffer from an attack of enterospasm brought about as the result of single or multiple fecal impaction lodged in the cecum, transverse colon, sigmoid flexure, or rectum, which acted as a constant source of irritation to the bowel. As a rule, the fecal accumulations were removed in short order by the aid of frequent and copious hot-water or soap-suds enemata; but when these failed, oil was prescribed in liberal doses and was injected in large quantities into the bowel, pure or in combination with glycerin or turpentine. Massage is occasionally of service in breaking up and propelling the fecal masses downward, but this is a dangerous therapeutic procedure to employ in chronic impaction, where ulceration may be present.

When fecal accumulations become impacted in the sigmoid flexure or rectum, and the measures just advised fail to bring them away, they should be broken up by the finger when situated low down in the rectum, or through the proctoscope or sigmoidoscope when higher up, after which they should be washed out by continuous irrigation. When the irritating feces have been removed, the inflamed bowel should be treated by mucilaginous or oily injections containing iodoform, bismuth, or some other soothing preparation, in order to allay irritation and prevent further enterospasm. On several occasions I have instantly relieved severe enteric spasm by introducing the proctoscope or sigmoidoscope and removing with a swab or forceps collections of tenacious mucus which had accumulated in the sigmoid at O'Beirne's sphincter or above the rectal valves.

In many cases of spastic constipation, quicker and more effective results can be obtained by combining the therapeutic measures already suggested for the relief of this condition with the rest-cure treatment.

Cold water is always contra-indicated in the treatment of spastic constipation because of its tendency to excite contractions of the intestinal musculature. Heavy massage, violent exercise, mechanical vibration, and electricity (except galvanism) are inadvisable in the handling of this class of cases, because they increase intestinal irritation, stimulate peristalsis, and otherwise contribute to the discomfort of the patient and the aggravation of his ailment.

CHAPTER XXX

ACUTE CONSTIPATION

Acute constipation, or the sudden cessation of the regular bowel movement, is most frequently referable to some form of mechanical obstruction or, in the case of newborn infants, to the partial or complete blocking of the bowel by a congenital malformation of the anus or rectum. It may also be brought about by violent emotions, change from an active to a sedentary occupation, business worries, riding on a train or steamer, acute infective or inflammatory diseases, and other causes elsewhere enumerated.

In the treatment of acute constipation the object to be obtained is to secure for the patient one or more evacuations, and thereby relieve him of the retained feces which are causing much annoyance and discomfort.

Surgical interference is always indicated when the trouble is due to a congenital deformity, and sometimes when the delayed evacuations are caused by another mechanical obstruction, but rarely are surgical measures necessary for the relief of acute costiveness from other sources.

In the vast majority of cases acute constipation can be quickly relieved by the liberal use of mineral waters (Carabana, Hunyadi Janos, Saratoga, etc.) or one of the saline cathartics, such as Carlsbad, Rochelle, Epsom, or Glauber's salts, Seidlitz powder, or phosphate of sodium, administered in doses varying from ʒj to viij (4.0–30.0 gm.). The compound licorice powder is another serviceable remedy in this class of cases when given in 1 or 2 dram (4–8 gm.) doses at night in a little water.

Castor oil is very generally used in the treatment of this ailment, because when prescribed in amounts varying from ℥ss to j (15.0–30 cc.) it facilitates copious evacuations and causes the patient but little if any discomfort.

By the aid of from one to four compound cathartic or compound colocynth pills, the bowel can usually be quickly and effectively cleared.

In acute constipation complicated by biliousness, calomel in fractional doses, or blue mass, will render good service, especially when the intestine is washed out on the following morning by one of the saline cathartics.

In addition to the remedies here advised, one or more of the laxative and cathartic medicines elsewhere suggested to give temporary relief in chronic constipation will also be found useful in the treatment of acute costiveness.

Violent purgatives, like elaterium, gamboge, croton oil, etc., are contra-indicated because they are injurious, induce a great deal of discomfort, and, further, because the constipated state can be overcome by means of more agreeable and less harmful drugs. When the medicines already recommended for the relief of acute constipation fail to accomplish the desired object, one is justified in attempting to secure the needed evacuations by means of small or copious high and low enemata of water, soap-suds, oil, or glycerin.

In cases of acute constipation, where the stools have been delayed for several days and the bowel has become impacted with feces, something more radical is necessary: under such circumstances a vegetable or mineral oil should be prescribed in liberal doses two or three times daily, and in the meantime copious injections should be made to soften and bring away the excrement. When the fecal accumulations are lodged in the cecum or transverse colon, this treatment should be continued until the desired result is accomplished. When the sigmoid flexure or rectum becomes impacted with large masses of hardened feces, and the treatment just suggested fails to dislodge and expel them, very energetic measures are in order. When the mass is situated low down, it may be broken up with the finger or handle of a spoon, but when situated in the upper rectum or sigmoid flexure, it is necessary to introduce the proctoscope or sigmoidoscope, and to divide the fecal mass into small pieces by the aid of long forceps. Once it has been separated into small bits, it can be quickly dislodged and washed out by the aid of one or more soap suds injections.

When, however, it appears that constipation is due to mechanical obstruction, this may be corrected or removed by the aid of one of the surgical procedures described in the following chapters.

CHAPTER XXXI

TREATMENT OF CONSTIPATION IN INFANTS AND CHILDREN

It is unnecessary for me at this time to discuss the various therapeutic procedures available for the treatment of constipation in children, because many of the measures elsewhere advocated for the relief and cure of costiveness in adults will, when properly modified, prove equally effectual in overcoming the constipation of the very young.

Here it is my purpose to consider in brief only such remedial agencies as I have found particularly adapted to the relief and cure of constipated infants and children.

It is advisable to examine the anus and rectum of all constipated infants in order to ascertain the presence of a malformation which would account for the delayed stools. When such an obstruction is found and is sufficiently severe to produce complete occlusion, immediate surgical intervention is imperative; but when it is only partial, laxative remedies should be administered to soften the feces and encourage daily evacuations, until such time as the child is strong enough to permit the correction of the deformity by operation.

Infants and older children who suffer from an attack of *acute* constipation should be relieved by the administration of small enemata composed of water, soap-suds, oil, or glycerin, and a liberal dose of castor oil, mineral water, one of the saline cathartics, cascara, or calomel. The salines are adapted to older children only, because infants reject or vomit them. Under such circumstances the more energetic cathartics and purgatives are unjustifiable because unnecessary and, moreover, apt to cause gastro-intestinal disturbances.

The treatment of *persistent* or *chronic* constipation in babies and older children is more difficult than the acute type, because here it is necessary to devise ways and means which will not only secure the desired daily evacuations, but which will at the same time permanently cure the constipation.

Under the prophylactic treatment of costiveness I have already pointed out the necessity, in this class of cases, of having the mother see to it that the infant or child nurses or takes its food at regular periods and in amounts suited to its age, and has its evacuations as nearly as possible at definite hours. Much can be done on the part of the mother to prevent and to overcome infantile constipation by gently rubbing or massaging the colon, and, more especially, the sigmoid flexure, in order to propel the intestinal contents downward and stimulate peristalsis. This procedure is indicated because of the deficient propulsive power of the bowel, which in early life is constituted principally of mucosa, the musculature having not as yet fully developed. In many constipated infants and children the anus is deformed, strictured, or quite often narrowed by sphincteric contraction from anal and peri-anal irritation induced by the fecal discharges. When such is the case, much can be done to encourage more natural and frequent stools by anointing the little finger with a healing ointment, such as lanolin and calomel, and introducing it into the bowel as often as may be necessary. The markedly beneficial results which follow this procedure are due to the dilatation of the anal outlet, the more effective peristalsis excited by the finger, and the lessening of sphincteric contractions as the excoriations are healed by the ointment.

The pernicious practice of administering remedies containing opiates or whisky to relieve colic induced by improper milk supply or swallowed air, is most heartily to be condemned, for the reason that it will lead up to or aggravate constipation; neither should lime-water be prescribed, except when absolutely necessary, because of its constipating tendency. On the other hand, barley and oatmeal-water may be freely given (oatmeal particularly), because they are harmless and produce an agreeable laxative effect.

Not infrequently the insufficient or delayed evacuations are due to the small amount of sugar or cream which the baby is receiving; this difficulty can be easily overcome by increasing the proportion of these ingredients in its food, but the percentage of fat in any milk mixture should not exceed 4 per cent. When the mother's milk contains an overabundance of *casein*, this can be satisfactorily diminished by having her increase the carbohydrates and fats and diminish the nitrogens of her own food, together with depletion of her system by the aid of the saline cathartics. The amount of casein in cows' milk may be diminished by dilution, but when this is done, the quantity of sugar and fats should be regulated accordingly. Gruel is preferable to water as a diluent because it breaks up the casein curd, but occasionally it is advisable to dextrinize the gruel.

Older children can often be cured of constipation by increasing the starchy constituents of the food and adding the natural fruit juices. Laxatives and enemata should never be employed to correct the costiveness of children until after a modification of the diet has been tried and has failed. Much can be done to soften the stools and to encourage peristalsis and glandular secretion by having young children drink one-half glass of water upon arising in the morning, eat abundantly of porridge, cracked wheat, and other cereals, which have been agreeably prepared by the addition of sugar and milk. The cereals should be boiled at least one hour. Children should be encouraged to form a habit of eating the coarser foods, which when digested leave a large residue and stimulate peristalsis, and to partake freely of vegetables, honey, sugar, raw and stewed fruits, all of which produce a gently laxative effect.

In the systematic treatment of infants and very young children I prefer enemata to laxatives, with the single exception of the sweet and so-called fruit laxatives. Warm-water injections are relaxing and produce turgidity with sluggishness of the bowel, and for this reason should never be employed in children. Cold-water enemata (with a little salt), on the contrary, not only afford temporary relief by securing an immediate evacuation, but do a great deal toward effecting a permanent cure through their decidedly tonic action upon the bowel. Frequently small (2 to 4 oz.) cold (65°–75° F.) injections are beneficial to these little patients, but both ½ to 2 pints cold and hot (90°–110° F.) large enemata frequently employed are very harmful, because of their tendency to dilate and distend the delicately constructed bowel. The technic of administering enemata is fully described in the chapter devoted to Enteroclysis.

In the treatment of artificially fed babies suffering from constipation, there is no remedy that will give more satisfaction than ʒj to ij (4.0–8.0cc.) of sweet manna dissolved in a feeding of milk; in older children it may be happily combined with senna and other more powerful laxatives.

Manna, in conjunction with the syrup or aromatic tincture of rhubarb, is especially efficacious in costiveness alternating with diarrhea, because of the secondary and constipating action of the rhubarb. Owing to its astringent qualities, rhubarb should not be repeatedly administered for the relief of constipation, except when combined with other medicines, which will modify this action of the drug.

Castor oil also tends to aggravate the constipated state after its cathartic effect has worn off, consequently it is not a desirable agent to employ in the treatment of constipation, except in cases where it is necessary for the time being to secure a quick action or to rid the bowel of impacted feces.

The saline cathartics (and mineral waters), such as the carbonate, sulphate, and citrate of magnesium, and the phosphate of sodium, in doses as small as will prove effectual, are excellent remedies with which to move the bowels in children of two years or over, but they should not be resorted to except when imperatively needed, and the dosage should be gradually reduced and the drug discontinued at the first opportunity. I prefer cascara sagrada to the last-named remedies, and prescribe it in the form of a cordial or the fluidextract, administered in syrup of orange-peel.

Purgin in small doses ($\frac{3}{4}$ to $\frac{1}{2}$ gr.) is a nicely acting laxative, which does not irritate the kidneys.

Nux vomica is a most excellent remedy in the treatment of atonic constipation, more especially when employed in combination with massage, exercise, electricity, etc.

Suppositories composed of cocoa-butter, soap, or gluten are useful means, by the aid of which quick and easy evacuations may be secured. Personally, I prefer long soap-cones or bougies to suppositories, for the reason that the soap, when permitted to remain in the bowel, has a tendency to cause annoying irritation within the anal outlet. The bougies used by me are made of Castile soap, are cone-shaped, and about 3 inches in length. When it is desirable to invite an evacuation, the bougie is repeatedly inserted into the rectum for about two-thirds of its length and then immediately withdrawn. The soap-cone employed in this manner favors an immediate passage by dilating the sphincter, lubricating the lower rectum, and exciting an active peristalsis. Soap-cones and suppositories should invariably be made of Castile soap, because other varieties induce skin eruptions when absorption takes place.

Cocoa-butter or tallow suppositories may be introduced into the lower intestine and be permitted to remain there, because they tend rather to allay than to create irritation, and at the same time by their presence excite peristalsis and facilitate the passage of the feces through the anal canal. Before resorting to drugs in the treatment of costive infants and children, it is advisable to make an attempt to overcome the constipated state by the intelligent use of cold baths, abdominal compresses or douches, small cold enemata, massage, exercise, mechanical vibration or electricity, alone or in combination. Exercise and bodily movements should be insisted upon for the relief of delicate children, who remain about the house the greater part of the time. Ordinarily, it is not necessary to prescribe exercise for these little patients because their muscles receive sufficient work and their lungs an abundant amount of oxygen while they are at play in the open air. The above-described physical therapeutic procedures can also be successfully employed in conjunction with the medical treatment.

CHAPTER XXXII

SURGICAL TREATMENT (TREATMENT OF MECHANICAL CONSTIPATION)

I WILL discuss the treatment of *mechanical constipation* (*obstipation, intestinal obstruction*) under the heading of the *surgical treatment* of costiveness, because in most instances surgical measures are required to effect a cure.

In this connection I wish particularly to discuss certain surgical measures which can be relied upon to remove or correct those milder forms of obstruction which, while sufficient to interfere with the regularity of the stools, do not often induce complete intestinal obstruction. The surgical treatment of various kinds of acute complete intestinal obstruction is given at such detail in the standard text-books on surgery that it is unnecessary to go fully into the subject in a work of this kind.

Non-operative procedures, useful in the handling of this type of constipation, will be discussed alone or in connection with the surgical measures, as occasion demands. I do not wish to convey the idea that all or even the majority of persons who suffer from chronic constipation need an operation in order to be cured. On the contrary, a large experience in the treatment of this ailment has demonstrated that in most instances this class of patients can be permanently relieved by more simple measures, such as correcting errors in diet, teaching them regular habits as regards sleeping, eating, exercising, and emptying the bowel, together with water drinking and a systematic course of massage, mechanical vibration, electricity, or hydrotherapy. Almost daily patients come to me who suffer from obstipation, and through my experience in handling a large number of these individuals I am thoroughly convinced that the causes of obstinate constipation are of a mechanical nature far more frequently than the profession realize. When the infrequent or incomplete stools are induced by an obstruction to the fecal current, the patient will not recover until this has been corrected or removed by physical treatment or a surgical operation, irrespective of whatever other non-operative procedures may be employed. In mechanical constipation of the acute type, surgical intervention usually affords instantaneous relief, but in cases of chronic obstipation complicated by atony it is necessary, in many instances, to institute a thorough systematic and postoperative course of treatment, in order to restore the sluggish bowel to its normal state. Patients should be informed as to the probable arising of this necessity in advance of the operation, otherwise they will shortly become discouraged, for it is difficult for them to understand why regular bowel movements do not occur as soon as the original cause of the obstruction has been eliminated. Chronically constipated patients having neurasthenia rapidly improve after the operation, both physically (because the bowel acts with greater regularity) and mentally, due to the fact that definite curative measures have been adopted in their behalf.

In this latter class of sufferers it is advisable to follow the operation with a four weeks' rest-cure treatment in order to overcome nervousness and improve the general condition. I have witnessed many remarkable cures by this plan of treatment in persons who were complete nervous and physical wrecks. It is advisable to keep in touch with these patients for a time after the treatment has been discontinued, so that they may be properly educated as to their manner of living.

Preparation of the Patient.—The method of preparing the patient, in the surgical treatment of constipation, varies according to the location and nature of the causative lesion. In the first place, I will give the preparation necessary for abdominal operations, and will then briefly describe the best way of preparing the rectum and anus, when these parts are to be operated upon. Patients requiring laparotomy should have at least two or three days' preparatory treatment in a sanitarium in order to accustom them to their surroundings, as well as to afford opportunity for a thorough emptying of the bowel and the proper preparation of the skin in the field of operation. The plan of Cushing, of rendering the mouth, stomach, and intestine as sterile as possible before and after celiotomies, by frequent cleansing of the teeth, sterilizing of the food, and the administration of intestinal antiseptics, is a good one, and deserves to be adopted more frequently than it is at the present time.

There are many *laxatives* and *cathartics* which may be successfully employed to clear the bowel. Among these, I have found serviceable the compound licorice powder, the salines, or one of the bitter waters. When the feces have collected in a considerable amount above the point of obstruction, frequent and liberal doses of castor oil, olive oil, or liquid paraffin are indicated to soften the masses, and at the same time copious high enemata of soap-suds or oil should be administered to dislodge and remove the feces.

Under ordinary circumstances laxatives are prescribed for two or three days prior to the operation, and on the same morning the bowel is cleansed by lavage.

When a resection of the intestine is contemplated and impaction seems probable, one or even two weeks may be required to prepare the patient for the ordeal. In certain cases the patient is kept upon a fluid diet and is given laxatives and high enemata every day until thirty-six hours before the operation, when the cathartic is stopped. From this time on the bowel is washed out occasionally, and catechu, small doses of opium, or some other remedy which ties up the bowel is prescribed, in order to prevent soiling of the wound during the operation. In preparing a patient for hemorrhoidal or fissure operations the laxative is given the preceding morning and is followed by two enemata, the first of which is copious and high and administered eight hours before the operation or in time to be expelled previous thereto, while the second, which is small (not more than ½ pint), should be injected into the rectum alone one hour before the patient is placed upon the table. Large enemata given shortly before the operation are partially retained in the colon and come away in spurts during the operation, much to the annoyance of the surgeon, whereas the smaller rectal injections are immediately expelled. When there is frequent gushing of the water, this can usually be quickly controlled by having an assistant or nurse strip the sigmoid flexure downward and force it all out at one time.

The abdomen is prepared by shaving and cleansing it, first with green soap and then with carbolic acid or a mercurial solution, after which it is entirely covered with antiseptic dressings. The next day, when the patient is taken to the operating-room, the abdomen is again scrubbed and cleaned with soap, alcohol, or ether, and finally washed with a saline solution.

Before beginning the operation it should be ascertained if the bladder has been emptied, and if this has not been done, the urine should be drawn.

Ordinarily, the patient should be placed upon his back on a table of suitable height, so constructed that he may be quickly changed to the Trendelenburg posture if necessary. When the exact location of the disease has been previously determined, it may be approached through an incision made directly over it, but in doubtful cases the abdomen should be opened through a median incision of moderate length applied between the umbilicus and the pubes, or an intermuscular incision through the right or left rectus muscle. The last-named procedure is preferable, because it leaves a better abdominal support when the incision is closed. In some instances it will be found advisable to push the rectus to one side during the operation.

Hemorrhage from all sources should be arrested before the peritoneum is incised.

Adhesions often result from unnecessary bruising of the bowel during operation, hence in this class of cases it is of the utmost importance that the viscera be handled as gently as possible.

In order to avoid infection from the intestine coming in contact with the wound or the skin, it should be carefully walled off with gauze pads.

Closure of the wound is a very important part of the operation and may be accomplished in many different ways. It is preferable to employ the tier method of suturing, except when the patient is in a critical condition from loss of blood or shock. Under such circumstances one is justified in quickly closing the abdomen with through-and-through sutures of silk or chromicized gut.

When the layer method is used, I employ a No. 1 plain gut for the peritoneum, No. 2 plain iodin or chromic catgut for the fascia and muscles, and a No. 1 plain for the skin. Over-and-over continuous sutures are applied throughout the deeper layers, except where there is difficulty in approximating the fascia, when the hitch- or lock-stitch is employed. Interrupted sutures are just as effective, but require a much longer time for their introduction. The edges of the divided skin may be quickly and satisfactorily united by either the continuous intercutaneous (Fig. 214), over-and-over (Fig. 218, IV), or the lock-stitch (Fig. 140).

The smaller sizes of chromic gut are preferable in abdominal operations because the proper preparation is more difficult in the larger sizes, which, moreover, may remain unabsorbed indefinitely, proving a source of serious annoyance.

When the patient is fat and there is considerable tension, I favor Moynihan's technic (*Abdominal Operations*, second edition, pp. 93, 94), which consists in picking up the peritoneum, transversalis fascia, and posterior sheath of the rectus with a continuous suture of No. 2 catgut. The needle is then laid to one side, while a series of interrupted silkworm-gut sutures, which include the skin, subcutaneous tissues, the anterior sheath of the rectus, and the back of the muscle, are introduced and left loose. The needle containing the catgut is then picked up and made to retrace the length of the wound, uniting the anterior sheath of the rectus and a few of its fibers. When the upper end or starting-point of the wound is again reached, the two ends of the gut are made fast, after which the superficial layers of the cut are approximated by tightening and tying the silkworm-gut stitches. Pagenstecher's celluloidin, linen thread, silk, or silver wire supporting sutures may be introduced when tension upon the suture line is very great; of these I prefer the first named because it induces less discomfort and does not cut out as often as the others.

In abdominal work the assisting physician and nurses should be few in number, well trained, and should observe the same precautions in preparing for the operation as the chief operator. Every one taking part should wear a sterile head-cap, face-mask, long gown, and rubber gloves. The gloves should be changed as soon as soiled. It is necessary at all times to prepare the hands with the greatest care, and this occupies considerable time if done as it should be. Visible dirt beneath the nails is to be removed with an orange stick, and the hands should be thoroughly washed two or three times, using green soap, water, and a nail-brush. Next, the hands should be held under running water to avoid all contact with the basin, and continuously scrubbed for several minutes (not less than ten), particular attention being paid to the cleansing of the nails and uneven places upon the fingers. When this part of the cleansing process has been completed, the hands are transferred to a basin containing a solution of the bichlorid of mercury, in which they are permitted to soak while the nails are again washed, using gauze in place of the brush; finally, they are dipped in alcohol, then in a sterile saline solution, and made ready for the drawing on of the gloves.

Some surgeons use the permanganate of potash and oxalic acid, and others, lime and soda, in preparing the hands, but it is doubtful if this adds anything to the safety of the patient, and if not, these agents should not be employed on account of their tendency, on protracted use, to roughen the skin and make the hands still more difficult to cleanse.

Multiple intestinal obstructions have been known to occur, and in order to guard against error it is advisable, in all cases of obstipation, to make a complete exploration of the abdomen while open. In operations for the relief of mechanical constipation drainage is rarely necessary, but when it is, a cigarette gauze-drain will be found the most efficient.

After the incision has been closed, the wound may or may not be sealed with collodion or "new skin," and then dressed with plain dry sterile gauze held in place by adhesive straps and covered with absorbent cotton and an abdominal binder.

The **postoperative treatment** following intestinal operations varies but slightly in different cases. While the patients are still nauseated, fluids should be prohibited, but the intense thirst of which they complain may be partially quenched by frequent rinsing of the mouth with plain lemon- or soda-water, or by permitting them to hold a little cracked ice in the mouth. In the absence of nausea, they may be permitted after twenty-four hours to take a fair amount of broth, soup, or milk, provided the latter does not increase the gases. Except when an anastomosis of the intestine has been made, these patients may be allowed to indulge in a light diet after the fourth day, and a full diet after the sixth day. After a resection, no heavy meals should be permitted for a week or ten days.

Many patients suffer greatly from gas pains while on a fluid diet, and in order to avoid unnecessary suffering from this source, it is advisable to permit them to partake of solid food as soon as possible. Others remain nauseated for several days following an abdominal operation and become extremely weak from the lack of food and the constant vomiting; under such circumstances, gastric lavage frequently gives relief, but when it does not, the patient should be strengthened by saline and nutrient enemata containing brandy, eggs, and other nourishment, administered as often as required.

Postoperative pain, when severe and persistent the first night, may be relieved by a hypodermic of morphin, but afterward phenacetin, aspirin, or antikamnia will suffice, and are preferable, in that they do not tie up the bowel.

To relieve *insomnia*, veronal, sulfonal, or trional in 10- to 15-gr. doses may be satisfactorily employed. In most instances it is wise to *open the bowel* on the fourth day by a dose of castor oil administered on the previous evening; subsequent movements may be secured by the administration of salines, bitter waters, like Carabana, dinner pills, cascara, or compound licorice powder. I rely mainly upon 2-oz. doses of liquid paraffin administered before breakfast to persons operated on for chronic mechanical obstruction, because it softens the feces, lubricates the bowel, and reduces intestinal irritation; moveover, the amount can be gradually reduced without promoting constipation. In some cases paraffin acts better where the dose is split and given both night and morning. Occasionally oil has a nauseating effect; under such circumstances it should be temporarily substituted by fruit or other mild laxatives. This class of patients should also be encouraged to consume butter, bacon, and other fatty foods in liberal amounts, and to eat freely of vegetables rich in cellulose when they suffer from mucous colic. After anastomosis, where the Murphy button has been used, it is advisable to keep the movements fluid in order to facilitate the voiding of the button. It is extremely difficult for many persons to secure a movement in the recumbent posture, and not infrequently they suffer from fecal impaction. When the accumulation cannot be dislodged by saline, soap-suds, oil, or glycerin enemata, they should be broken up with the finger and then washed out by means of repeated injections.

Following the majority of rectal operations, an effort should be made to obtain one semisolid evacuation each day. Cathartics which cause frequent fluid passages are undesirable because they exhaust the patient, induce pain and tenesmus, favor hemorrhage, and frequently contaminate the wound. The common practice of tying the bowel up with opium after a rectal operation is harmful and should be abandoned, because it favors the accumulation of large hard fecal masses which during expulsion lacerate the wound and induce severe defecatory pain.

Distention and colicky pains which do not yield to a regulation of the diet are usually controllable by the administration of frequently repeated doses of salol, betanaphtol, subnitrate of bismuth, and powdered charcoal, alone or in combination. When suffering from this source is of frequent occurrence, severe, and prolonged, much can be done for the patient's comfort by applying galvanism, friction-massage, the hot-water bottle, or hot fomentations over the seat of the pain. When the accumulation of gas is in the large bowel the patient may be instantaneously relieved by inserting a colon-tube into the sigmoid flexure and permitting the gas to escape.

Following abdominal operations, most patients may be allowed to sit up in from one to two weeks, but better results are obtained in constipated subjects when they are kept in bed for a while longer and given the benefit of the rest-cure, massage, and a suitable diet.

When patients of this class have not fully recovered from their constipation before leaving the hospital, they should be instructed to come to the office for such other treatment as may be required. Many operations performed for the relief of mechanical constipation fail, either because the operator does not take the proper means to strengthen the atonic bowel after the original cause of the trouble has been removed, or because he does not instruct the patient as to his manner of living after he has been discharged.

INTESTINAL SUTURES

The success obtained in intestinal operations depends largely upon the suture material employed and the way in which the stitches are introduced. The suture material may be *soluble* (plain chromic or iodin catgut) or *insoluble* (Pagenstecher's celluloidin, linen thread, and silk), depending upon the purpose for which it is to be employed. Material of either kind will prove satisfactory for the inner or through-and-through suture, but linen or silk thread should be invariably employed to unite the peritoneal surfaces when an anastomosis is made. For the latter purpose I prefer Pagenstecher's thread to silk because it is firm, less likely to attract infectious matter, does not fray, is easier to handle, and causes less irritation than silk.

Modern surgeons make no attempt to separately approximate the edges of the mucosa and other layers of the cut ends, nor do they worry because the point of the needle by chance enters the bowel, having learned that the danger from infection is greatest when the suture line contains many knots, and more especially when these are placed outside the bowel, where they encourage infection through capillary attraction from within.

It is generally agreed that leakage is less likely to occur when the knot is placed inside the gut, consequently it is important when introducing the through-and-through suture to see that the needle is passed through the mucosa and then pierces the entire thickness of the approximated ends, coming out through the mucous membrane of the other segment, and then, when it is knotted, capillary attraction will be toward the inside of the bowel.

The through-and-through suture is constantly becoming more popular, and deservedly so, because it perfectly controls hemorrhage, makes a close and firm approximation of the divided ends, and in case of gas distention following the operation, removes tension from the peritoneal suture line.

Some operators maintain that reënforcement with an outside or seromuscular suture is unnecessary, but I prefer to take this extra precaution to obviate possible danger from leakage caused by imperfect union or sloughing of the inner suture. A second or third infolding of the serosa, as sometimes practised, is unnecessary and harmful because it requires additional time, increases the danger from infection, and tends to the formation of an obstructive ring within the bowel.

In order to have a reliable outside suture line, the needle must dip down deeply into the wall of the gut and pick up the tough muscularis mucosa, the muscular coat, and the peritoneal covering. No reliance whatever can be placed upon a suture which includes the serosa only, for the reason that it tears out easily.

The through-and-through and seromuscular suture lines may be either interrupted or continuous. I prefer the latter, carefully introduced, if it is occasionally broken by a back- or lock-stitch (Fig. 146, B), to prevent slipping and constriction of the gut, because it is a time saver and is more likely than the former to effect a perfect approximation.

The principal objections urged against the continuous suture are that strangulation is more likely to occur, there is no room for expansion in case of distention, and if the stitch breaks at one point, the entire suture line gives way. This latter disadvantage may be overcome by tying the suture at each quarter as it passes around the bowel.

Having discussed in a general way the respective merits of the inner or through-and-through and the outer or seromuscular sutures, I will now describe the technic of their introduction, and in doing so will confine myself to a brief description of the technic of those surgeons only whose methods have been most favorably received.

Lembert Suture.—This suture, as originally suggested by Lembert, or in a modified form, is the most generally used of all the sutures thus far devised for intestinal anastomosis and the closure of wounds in the gut wall.

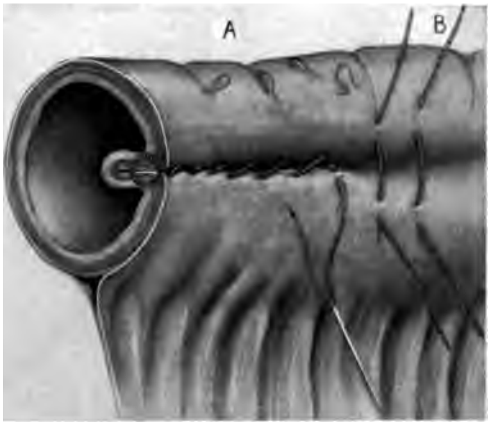

Fig. 143.—Lembert sutures: A, Continuous; B, interrupted.

As introduced by Lembert this stitch was interrupted (Fig. 143, B), but Dupuytren used it continuously (Fig. 143, A), and when so employed it bears his name. The Lembert suture is simple, effective, and can be quickly introduced. A needle threaded with linen or silk is made to enter the bowel wall at a *right angle* to, and about $\frac{1}{4}$ inch from, the edge of the wound and to pick up the serous and muscular coats, when it is directed upward and brought out midway between the point of entrance and the incision. It is then carried across and made to pierce the outer coats $\frac{1}{8}$ inch from the wound, and is brought out the same distance further on; the ends of the suture are then tied, which causes the divided ends o ome inverted and approximated

(Fig. 143). When the suture line is to be interrupted, several further stitches are similarly introduced, but in the placing of a continuous suture a bite is taken first on one side of the cut edges and then on the other, and so on back and forth, after the manner shown in Fig. 143, until the edges of the two peritoneal surfaces have been united all around.

Cushing Right-angle Suture.—This is a continuous seromuscular suture, but differs from the Lembert in that the needle bites are taken in a direction parallel with, rather than at a right angle to, the wound. Cushing's technic is practised by many good surgeons. A fair idea of the method of introducing this suture may be obtained by a study of the accompanying illustration (Fig. 144).

Halsted's Mattress Suture.—The Halsted is a reliable interrupted seromuscular stitch (Fig. 145), which has been extensively employed both for end-to-end and lateral anastomosis. It effects an accurate approximation between the segments of gut to be joined and induces a decided infolding of the peritoneal surfaces. Halsted maintains that his suture is superior to the Lembert and does not need to be reënforced. It is inserted by first introducing an interrupted Lembert stitch, the needle is then reintroduced on the same side at a point ⅛ inch from its exit, and a second Lembert is introduced, after which the two ends of the thread are drawn tight and knotted. The succeeding stitches are in turn introduced in the same manner (Fig. 145). The Halsted suture requires a little more time than does either the Lembert or Cushing.

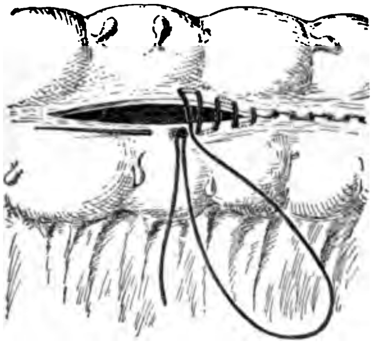

Fig. 144.—Cushing right-angle suture.

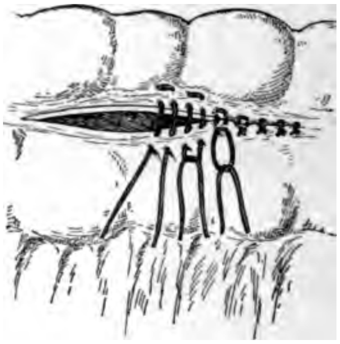

Fig. 145.—Halsted mattress suture.

The Glovers' Suture (Fig. 146).—This is a continuous through-and-through and whip or over-and-over suture, which is very frequently employed for the inner suture line. It is popular because it can be quickly introduced, arrests bleeding, and effects an accurate and firm union of the intestinal walls to be joined. Some surgeons rely solely upon the approximation thus made, but it is my custom to complete the operation with a continuous outer or seromuscular suture.

Maunsell's Technic.—Maunsell (*Internat. Journal Med. Sci.*, 1892, p. 245) has devised a very ingenious method of anastomosis, the steps of which, briefly described, are as follows: *First*, the through-and-through stitches are introduced and tied, one at and the other opposite the mesenteric attachment, to approximate the divided ends, steady the bowel, unite the mesentery, and close the triangular *dead space* (Figs. 152, 159), where it diverges from the gut. These sutures, together with others placed on either side of the bowel and between them, are allowed to remain to act as tractors during the operation. *Second*, an incision (Fig. 147) 1½ inches in length is made in the proximal segment of bowel at least 1 inch from the suture line, and the divided ends are invaginated and withdrawn through it by pulling on the tractors (Fig. 148). *Third*, through-and-through sutures are then placed by passing the needle through both thicknesses of the bowel in such a way that the thread may be hooked up from the inside, divided and tied, thus leaving two stitches for each passage of the needle, which when tied leaves the

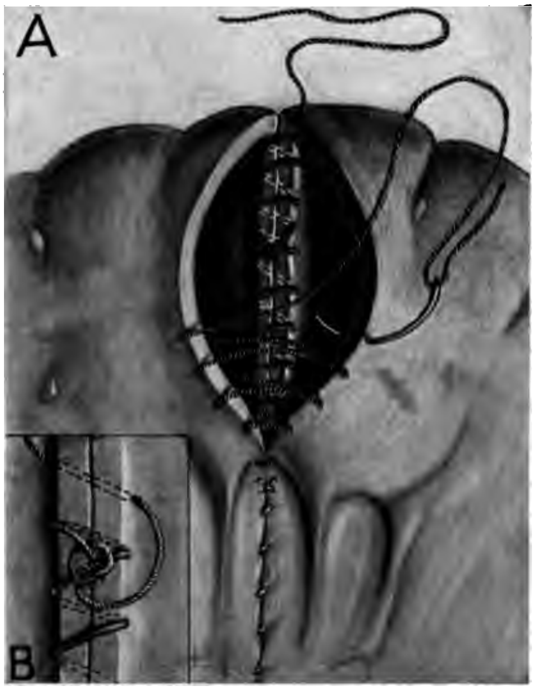

Fig. 146.—A, The glovers' or whip-stitch; B, lock- or hitch-stitch.

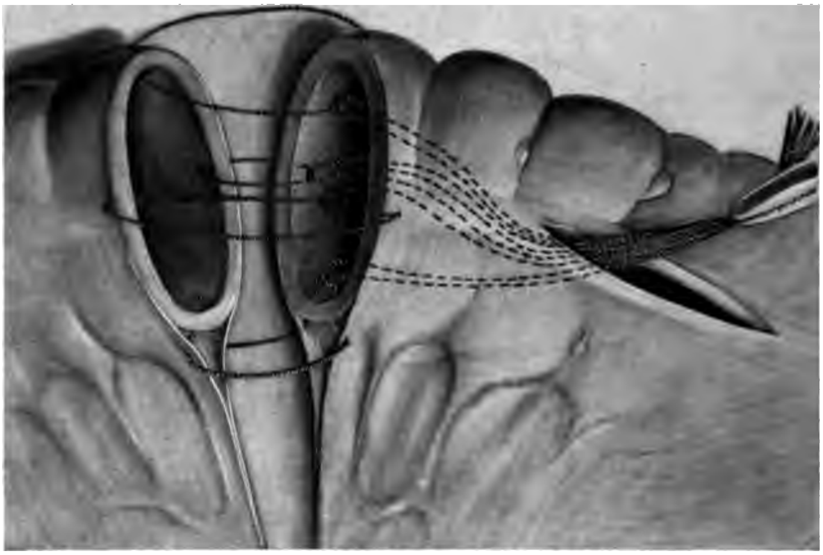

Fig. 147.—Maunsell's invagination anastomosis, showing tractors and mesenteric stitch in place and the incision through which the bowel is to be drawn.

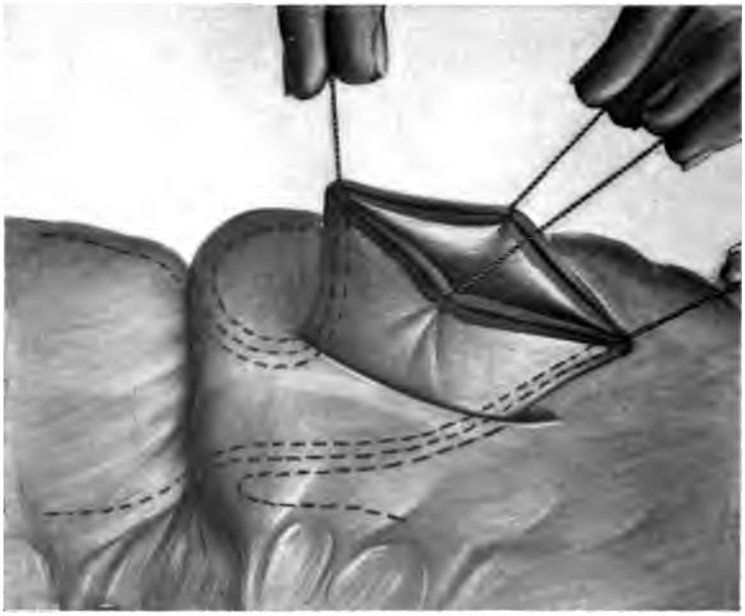

Fig. 148.—Maunsell's invagination anastomosis, showing gut invaginated and ready for the through-and-through suture.

knot inside the bowel. The technic of the suture line may be varied according to the judgment of the operator, and the stitches may be interrupted or continuous and of the glovers' or other type. *Fourth*, when the union is complete, the tractors are removed, the invagination is reduced, the longitudinal incision is closed by interrupted or continuous Lembert stitches, after which the suture line is reënforced by the introduction of a continuous seromuscular suture for strengthening purposes, and a more perfect approximation of the peritoneal surfaces. It is claimed that this latter precaution is unnecessary, but, nevertheless, I believe it adds greatly to the safety of the patient.

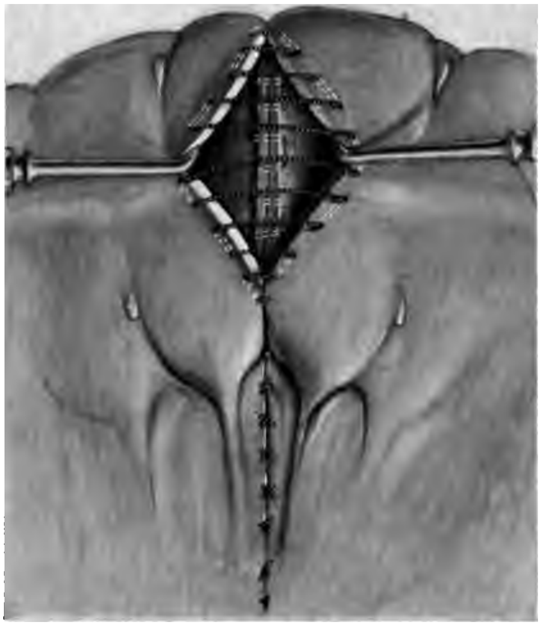

Fig. 149.—Connell's continuous suture.

Maunsell was a pioneer in advocating the through-and-through suture and the leaving of the knot on the mucous surface, and the above technic was devised by him with that object in view. The principal objection to his procedure is the necessity of making the longitudinal cut in the bowel, which in turn requires to be closed; this, however, does not materially increase the danger of leakage, since incisions of this kind usually heal promptly; it does, however, add to the length of the operation.

Connell's Suture.—In order to avoid the disadvantage of Maunsell's operation and devise a through-and-through method of suturing the intestine and leaving the knots within the bowel, Connell worked out his procedure.

The Connell suture (Fig. 149) is a great favorite, because it can be employed for both end-to-end and lateral anastomosis, controls bleeding, gives firm union, and so closely approximates the peritoneal surfaces that an outside or seromuscular suture is unnecessary, and further, because this method of stitching can be either continuous or interrupted. After having introduced four traction threads to approximate the ends and steady the bowel, a fine needle threaded with linen or silk is passed through the entire thickness of both segments about ¼ inch from the edge, and carried along the same side for a distance of ⅛ inch, when it is again passed through both gut walls upon the mucous surface near the point of entrance. If the suture is to be interrupted, the stitch is tied and other similar sutures are introduced; or if continuous, it is carried backward and forward until the suture line is completed. The introduction of the first three-quarters of the suture is easy, but the completion of the last quarter is much more difficult. In order that the final knot may be left on the inside of the bowel, Connell devised the following unique plan of dealing with the *last stitch:* He

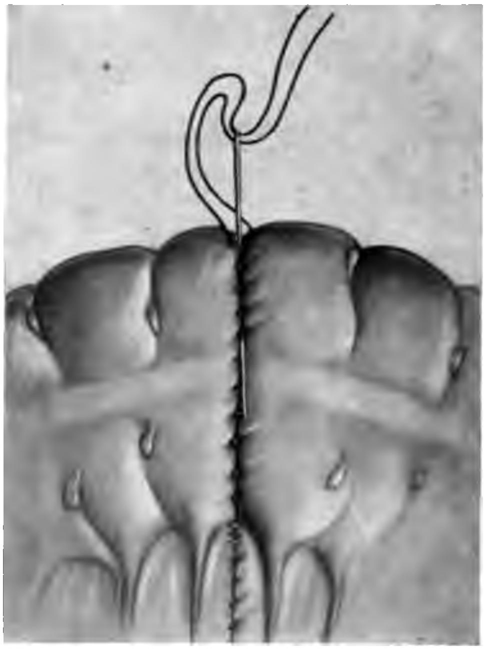

Fig. 150. First step in method of placing the last stitch.

forces the blunt end of a needle or ligature carrier between the stitches at a short distance from the gap to be closed, and then out through it, where it is threaded with the loose ends (Fig. 150). It is then withdrawn and traction made upon the threads to tighten the suture line; finally, the ends of the stitch are tied and the knot returned inside by rolling the bowel between the fingers or pushing it in with the blunt end of a needle (Fig. 151). It is well to take an occasional back- or hitch-stitch, when the continuous suture is employed. When the approximation of the peritoneal surfaces is not perfect, the Connell should be reënforced by an outside suture. In this, as in other methods, it is necessary carefully to suture the mesentery with the bowel.

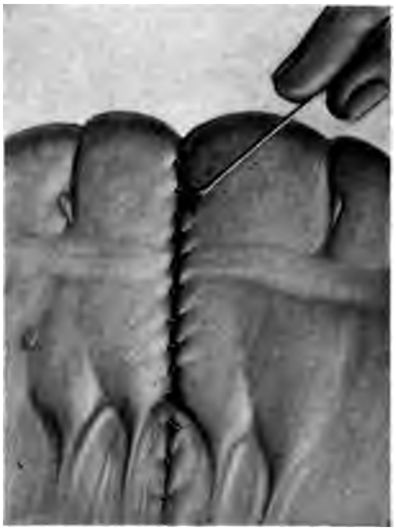

Fig. 151.—Second step in method of placing the last stitch.

The Connell suture inverts the peritoneal edges better than Maunsell's, and is less apt to cause strangulation.

Moynihan's Technic (*Abdominal Operations*, second edition, 1906, p. 394).—This operator partly approximates the peritoneal surfaces of the bowel and lays the needle aside. The posterior edges of the bowel are then united by a through-and-through whip-stitch, but the needle is brought outside the gut as the anterior suture line is reached and the manner of placing the suture changed to infolding of the mucosa. He carries the needle across the wound and then makes it pass from without through the gut wall, from thence to one side for ⅛ inch, and then again from within to the intestine to the outside, and then once more across the wound, where a second suture is introduced in the same manner, and so on until the anastomosis is complete. The last turn in the stitch passes from serosa to mucosa, where it is tied. The anastomosis is completed by picking up the second needle and finishing the outer seromuscular suture.

It will be noticed that in Moynihan's technic the loops formed and the knot remain inside the bowel.

Maunsell's M **h.**—Of the different technics suggested for appro f the gut at the mesenteric border, and of eliminating the triangular or dead space, the point of usual leakage, caused by the divergence of the peritoneal covering at this point. I believe Maunsell's to be the best, though that of Connell is also good.

In introducing the Maunsell mesenteric stitch, the needle from within is made to pierce the thickness of the gut wall above the mesentery, and then pick up the peritoneal reflection, and is next made to pass directly across and through the peritoneum and gut wall of the other end. It is then carried to one side for ¼ inch and again made to penetrate the intestine and the mesenteric reflection, after which it is once more carried across the wound and enters the bowel in the reverse order (Fig. 152); the ends of the suture are then snugly tied.

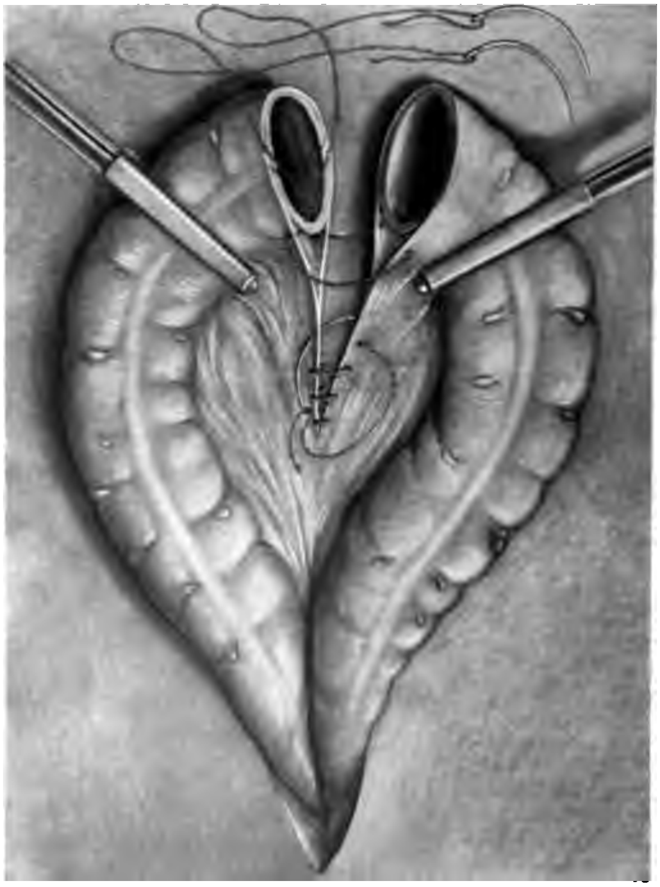

Fig. 152. Showing method of introducing the Maunsell mesenteric and through-and-through sutures as practised in the author's technic of circular enterorrhaphy. Below is shown a simple method of approximating the mesentery.

The advantages of this stitch are that it does away with the dead space, gives a firm union to this part of the suture line, and leaves the knot on the mucous surface, which diminishes the danger of infection from capillary attraction.

The **Mitchell Hunter's stitch** is also serviceable for approximating the separated edges of the divided mesentery where it extends over a considerable area.

Insertion of the Last Stitch.—The danger of leakage following operations where an anastomosis has been made is greatly diminished by introducing the sutures in such a manner that the knots when tied remain upon the mucous surface. To accomplish this, through-and-through stitches are necessary; then the problem arises as to how to complete the union and place the final stitch so that when tied the knot will remain on the inside of the bowel. Thus far no entirely satisfactory method of doing this has been suggested. A very good way is to carry the suture around to its beginning (Fig. 150), and then tie and cut off the loose ends, leaving the diminutive gap that remains to be closed by one or more interrupted Lembert sutures, or to be taken care of by the continuous reënforcing seromuscular suture, or to complete the approximation by a Cushing *right-angle* stitch, or the technic of Connell (Figs. 150, 151), which has already been described.

Omental Grafting.—When, after anastomosis, it is found that the union is not perfect, or that there is danger of leakage from any other cause at a particular point along the suture line, this should be protected by grafting a part or detached segment of the omentum upon it, or by joining the peritoneal surfaces of the bowel to a neighboring viscus.

Closure of the Mesenteric Wound.—When doing a resection it is sometimes troublesome to decide how to deal with the mesentery. At all times the area of gut removed should be slightly in excess of the attached mesentery (Figs. 152, 161), in order to ensure that the extreme ends of the bowel are not deprived of their blood-supply. A wide strip of mesentery may be ligated and divided close to the bowel, the edges closed with a running suture, and the excess of mesentery folded and fastened upon itself by the insertion of interrupted or continuous sutures after the approximation of the bowel ends is completed. Ordinarily, a V-shaped section of the mesentery is clamped and removed with the bowel. The wound thus formed may be satisfactorily closed with the continuous whip-stitch, which takes the least time (Fig. 153), or the Cushing right-angle, or the lock-stitch. Interrupted Lembert or Halsted sutures are equally effective, but cannot be introduced rapidly enough.

A mesenteric suture line may be single or double, but to preclude the possibility of hemorrhage, Moynihan advises against through-and-through suturing. He controls bleeding and closes the mesenteric wound by picking up the edges of the mesentery at several points and drawing them together, where they are ligated.

Bleeding may be controlled by catching the vessels and ligating them as they are divided, or the mesentery may be first ligated and then divided in sections, or a much larger area may be included in a strong interlocking suture, and then divided in one broad sweep with the knife or scissors.

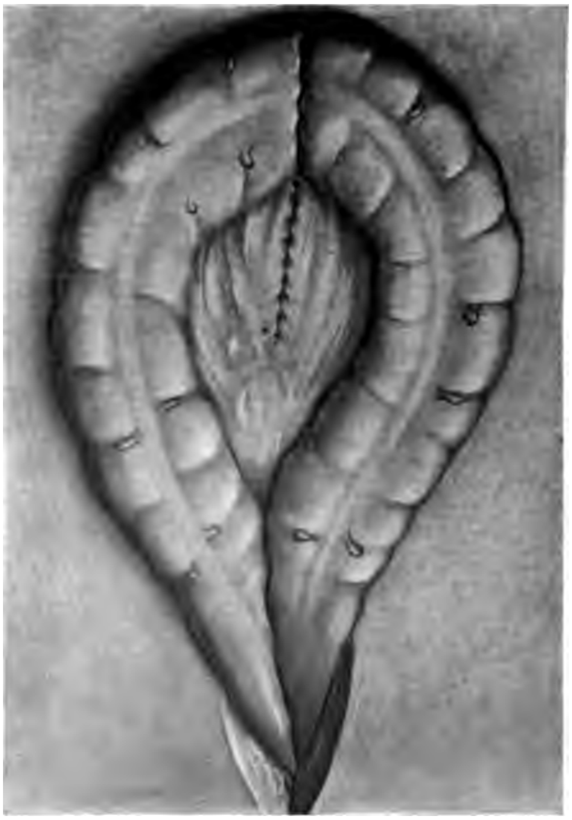

Fig. 153. Showing seromuscular coat and mesentery accurately approximated.

In closing the wound in the mesentery particular pains should be taken to avoid injury to the larger vessels located near its attachment, and to accurately approximate the edges at its junction with the bowel.

Purse-string Suture.—This is a very useful suture and is most generally employed in anastomosis operations (Figs. 158, 159), where the Murphy button (Fig. 160), decalcified bone-bobbin, or other mechanical device is used, and for forming a blind end to the gut (Figs. 154–157) in cases where a part of the intestine is to be excluded (Figs. 173–175). Until recently it was customary in forming a blind end to quickly close it by a through-and-through suture (Fig. 154), then turn it in, and complete the operation by the insertion of a row of continuous or inter-

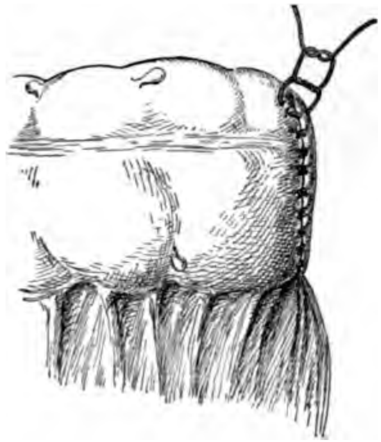

Fig. 154.—Method of forming a blind end to the intestine. First step: closing of the divided end by a continuous through-and-through catgut suture.

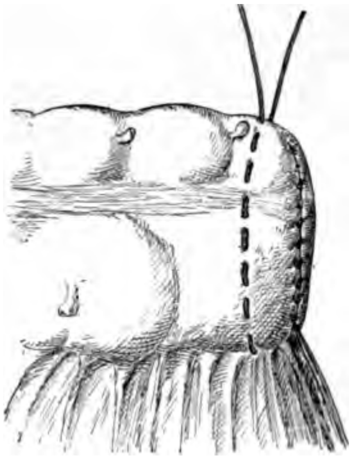

Fig. 155.—Method of forming a blind end to the intestine. Second step: placing of purse-string suture.

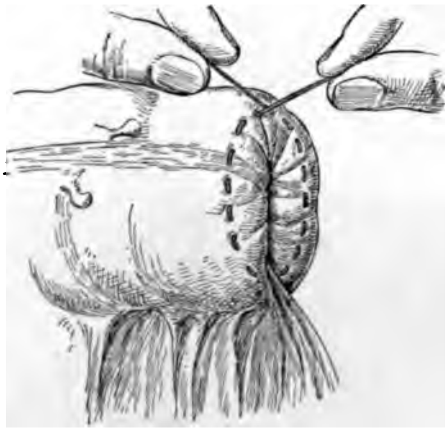

Fig. 156.—Method of forming a blind end to the intestine. Third step: tying of purse-string suture.

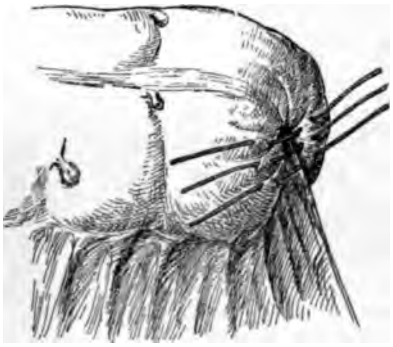

Fig. 157.—Method of forming a blind end to the intestine. Fourth step: burying of attached mesentery.

rupted Lembert stitches. The newer and better way is to quickly seal the end of the gut with a running stitch (Fig. 154), introduce a

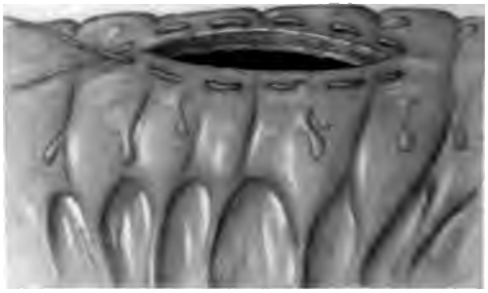

Fig. 155. [illegible] of introducing the seromuscular purse-string suture.

purse-string suture (Fig. 155), and then invert the bowel and tie the circular stitch (Fig. 156), and finish the procedure by the insertion of one or more interrupted Lembert sutures (Fig. 157) to make the peritoneal approximation complete.

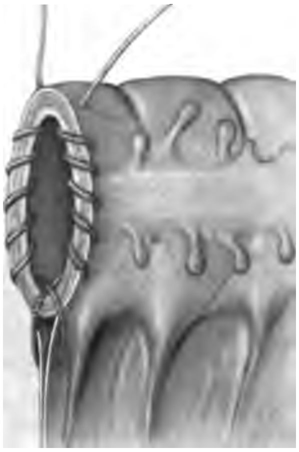

Fig. 159. Showing method of placing Murphy's through-and-through purse-string suture.

When an anastomosis is to be made with a Murphy button (Fig. 160) or similar device, the purse-string suture may be seromuscular and started at a point opposite the mesenteric attachment, quickly carried around the bowel and made to emerge at a short distance from the point of entrance, the ends being left long and ready to tie when one segment of the button has been inserted; or when a lateral anastomosis is made, it may be introduced and made to surround the incision in the same manner (Fig. 158). Murphy employs an over-and-over or whip-purse-string suture, but in such a way that the dead or triangular space at the mesenteric attachment is closed and the ends of the suture emerge and are knotted directly opposite this point (Fig. 159).

The seromuscular should be introduced before, and the whip-suture after, the intestine has been divided.

I have frequently used both types of purse-string sutures, and believe that there is very little to choose between them, with the exception of the increased danger from infection caused by dealing with the unclean bowel in the Murphy technic.

Needles.—The needles used in intestinal anastomosis should be small, round, and have a sharp point, in order to facilitate the work and prevent bleeding. Large needles are difficult to use, and those which have a cutting edge may give rise to troublesome hemorrhage.

I have found an ordinary straight cambric needle satisfactory for the introduction of seromuscular stitches. Milliners' No. 3 may also be employed for this purpose. A surgical or a Moynihan's curved needle should be employed in placing the through-and-through sutures, because it is extremely difficult to use a *straight* needle for the inside work.

A needle holder is not essential to the experienced surgeon in this class of operations.

LOCALIZATION OF THE INTESTINE

It is very important for the operator to differentiate between the various parts of the bowel when operating for the relief of intestinal obstruction. It is easy to ascertain which is the large and which the small gut, because under ordinary circumstances the former has a grayish and the latter a pinkish tint, and further, because the colon can be identified by its thickness, larger size, sacculated appearance, longitudinal bands, appendices epiploicæ, and its thicker and fatter mesentery.

The cecum and the ascending, transverse, and descending colons rarely change their position and can be readily distinguished, but the sigmoid flexure sometimes causes confusion because of unusual length or displacement, and may be mistaken for some other part of the large bowel.

It is at times extremely difficult to distinguish between the different parts of the small intestine. The small gut is largest and thickest at its upper extremity, and gradually diminishes in size throughout the upper two-thirds of its length, while the lower third remains the same throughout, and the mesentery of its segments has but a single loop, while that of the lowermost has two or three of these vascular loops.

In order to avoid interference with the bowel movements, it is advisable to verify in each case the direction of peristalsis, which under normal conditions is from above downward. This can be done by studying peristaltic contractions, as excited by the application of an electrode, a piece of ice, or a few crystals of sodium, or by pinching or suddenly striking the gut two or three times in succession.

Monks (*Trans. Am. Surg. Assoc.*, 1903) has described a method of determining the direction of the peristaltic movements which I have found to be extremely useful—viz., the gut is freed of kinks and arranged parallel with its mesenteric attachment, and when this has been accomplished, the upper part of the segment under scrutiny will be the ***proximal***, and the lower part the *distal*, end.

CHAPTER XXXIII

INTESTINAL OPERATIONS

Intestinal Anastomosis. Enterectomy, Colectomy, Typhlectomy or Cecectomy, Sigmoidectomy. Enterostomy, Colostomy, Typhlostomy or Cecostomy, Sigmoidostomy.

General Remarks.—The following are the principal operations employed in the surgical treatment of mechanical constipation. The procedures enumerated under 1 to 6 are all individually discussed; whereas, for a description of *colopexy*, *typhlopexy*, *sigmoidopexy*, *colopexostomy*, *gastropexy*, *hepatopexy*, *nephropexy*, *splenopexy*, and *stretching* of the *linea alba* the reader is referred to the chapters on the Treatment of Splanchnoptosis and the Special Forms of Enteroptosis, and for the *rectal operations*, to the section of this work devoted to the treatment of diseases of the rectum and anus.

(1) Intestinal anastomosis.

(2) Enterectomy, colectomy, typhlectomy or cecectomy, sigmoidectomy.

(3) Enterostomy (colostomy, typhlostomy or cecostomy, sigmoidostomy).

(4) Proctectomy.

(5) Closure of artificial anus and fecal fistula.

(6) Intestinal exclusion.

(7) Colopexy, typhlopexy or cecopexy, sigmoidopexy, colopexostomy, gastropexy, hepatopexy, nephropexy, splenopexy, stretching of the linea alba.

(8) Operations upon the rectum.

INTESTINAL ANASTOMOSIS

So many of the diseases which cause obstipation require intestinal anastomosis for their relief and cure that I have decided to discuss the technic of this procedure fully now in order to avoid a repetition when the surgical treatment of the different ailments is given further on. Until within the last few years anastomosis between segments of the bowel or between the intestine and another viscus was considered a difficult and dangerous operation, but surgeons of to-day have no hesitancy in resorting to this procedure for the relief of curable as well as incurable affections of the bowel.

The growing popularity of anastomosis and the favorable results now obtained are referable to asepsis, the simplified and improved technic, and the fact that surgeons are beginning to realize that this procedure has a much wider field of usefulness than was formerly assumed.

There are three different ways of uniting two segments of the intestine, viz.: (1) *By end-to-end anastomosis;* (2) *by lateral anastomosis;* (3) *by end-to-side anastomosis.*

Following resection, end-to-end should take precedence over lateral anastomosis, because it never interferes with peristalsis and there are no blind ends to close. Lateral anastomosis, however, should be practised when the divided ends are of unequal size and disease has rendered the bowel on either side of the lesion unfit for end-to-end union.

End-to-side anastomosis should not be resorted to under any circumstances, except when one end of the bowel is larger than the other (even then lateral anastomosis is preferable), because the operation is difficult and is prone to be followed by leakage and peritonitis.

All types of anastomosis can be performed with either the ***sutures alone method*** or by the aid of *mechanical devices.*

The **sutures alone method** (Figs. 146, 149) is the procedure of choice, and the most generally practised at the present time, because it effects a firm and accurate joint, and is followed by a lower mortality, with fewer accidents, than is the case when mechanical appliances are employed.

Anastomosis with Mechanical Devices.—A great many mechanical appliances have been devised as an aid to intestinal anastomosis, but most of them have been discarded for one reason or another. Among those which are still in use to a greater or lesser degree, named in the order of their usefulness, are Murphy's button, McGraw's rubber ligature (Fig. 187), Robson's decalcified bone-bobbins, and Laplace's and O'Hara's intestinal forceps.

In my own practice, when mechanical aids are employed, I use either the Murphy button (Fig. 160) or the McGraw ligature, and have generally found them satisfactory. A few years ago the majority of intestinal anastomosis operations were performed with the aid of mechanical appliances, but at the present time these are being rapidly discarded in favor of the "sutures alone" method. In fact, it is difficult at the present writing to find experienced surgeons who use mechanical aids in their anastomotic work, except where there is some special reason for doing so.

There is a tendency on the part of the younger members of the profession to employ mechanical aids because they mistrust their own technic, or because they can perform the operation much more rapidly with than without their assistance.

Mechanical aids are justifiable, and should be employed whenever it is imperative that anastomosis be quickly made; when a short mesentery or adhesions prevent withdrawing of the bowel for end-to-end anastomosis; when the ends of the gut are of unequal size, and when the technic of the operator is imperfect.

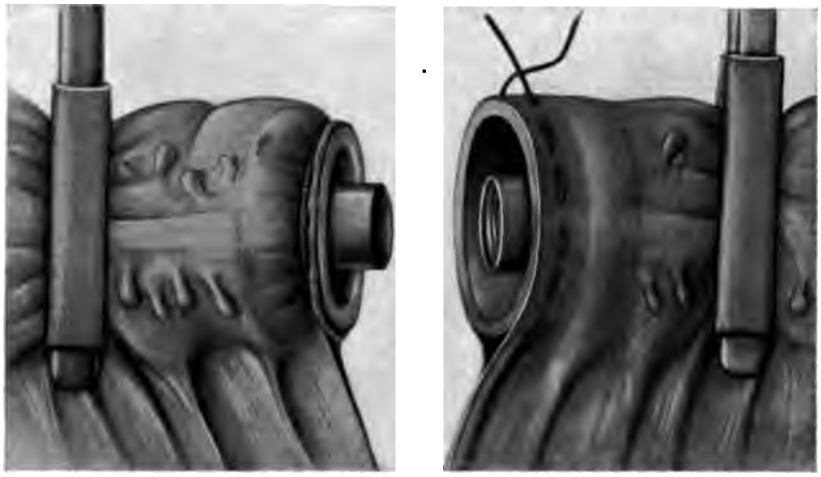

Fig. 160.—Method of performing end-to-end anastomosis with the Murphy button.

The chief advantage claimed for mechanical devices is the time saved in making the anastomosis. Formerly this was quite an important factor, because then the mucosa and other coats of the bowel were separately united, but with the improved technic practised to-day, where the segments of gut are quickly joined with a continuous through-and-through suture, reënforced by a seromuscular stitch, the time required for the operation has been greatly diminished.

In proportion as the technic of the "sutures alone" method has been improved, the popularity of the Murphy button and other appliances has waned. Moynihan (*Abdominal Operations*, second edition, p. 353) says, "the buttons and the bobbins, the elastic ligatures and the forceps of many forms have no more than an historic interest," and I agree with him that they should be discarded as an aid to anastomotic work, except under the conditions above mentioned.

Briefly summed up, the objections to the Murphy button are that it is unnecessary, the tissues over the button may slough, the opening left may become strictured, the button may cut only part way out and cause annoyance and pain, it may be retained and produce intestinal obstruction, the right size may not be at hand, it may become blocked with feces before being discharged, is expensive and difficult to obtain in remote districts, and its use is more apt to be followed by leakage and peritonitis than the simple suture method.

End-to-end Anastomosis with Sutures (Circular Enterorrhaphy).—In the hands of the experienced surgeon this method of restoring the continuity of the bowel after resection is easy, effective, does not interfere with peristalsis, and requires but a short time.

The steps in the operation of resection and circular enterorrhaphy as practised by me are as follows: The diseased piece of bowel, after being walled off with gauze handkerchiefs, is stripped and clamped in four places to prevent leakage from the ends of the bowel when the resection is made, which is done by dividing the intestine between the clamps on both sides of the diseased gut. After the involved segment and attached mesentery (Fig. 161) have been removed, and the intestine is found to be greatly distended, the clamp is temporarily removed and the gut drained before an attempt is made to unite the divided ends. When this has been necessary, the clamps are reapplied to prevent leakage, and the gauze and gloves are changed to diminish the danger of infection.

By the aid of the clamps the ends of the bowel are brought into close apposition (Fig. 152) and held in place by an assistant, while tractor sutures are introduced to hold them together and facilitate suturing. In making the suture line I introduce the Maunsell mesenteric stitch (Fig. 152), which is knotted, both ends being left long and threaded into curved intestinal needles (Fig. 152). I then pick up one of the needles and rapidly install one-half of the suture line, using either Connell's (Fig. 149) or the glovers' (Fig. 146) stitch, bringing the thread outside of the bowel opposite the mesenteric attachment, where it is held by an assistant until the other half of the suture introduced in the same manner has been completed, and the needle brought out at a point directly across the wound from the other thread. The two ends are then tied, cut, and the knot pushed inside the bowel, and one, two, or three interrupted Lembert sutures are introduced to close the gap and make the inner suture line complete. A single Cushing suture or the above-described method of introducing the last stitch (Figs. 150, 151) may also be employed to advantage in completing the suture line.

To make a more perfect union the peritoneal surfaces all around are imbedded by the introduction of a continuous Lembert suture (Fig. 153). In placing both the outer and the inner sutures an occasional *back-* or *lock-stitch* (Fig. 146, B) is installed to prevent slipping of the thread during the operation, and to obviate the constricting or puckering effect of the continuous suture when this precaution is not observed.

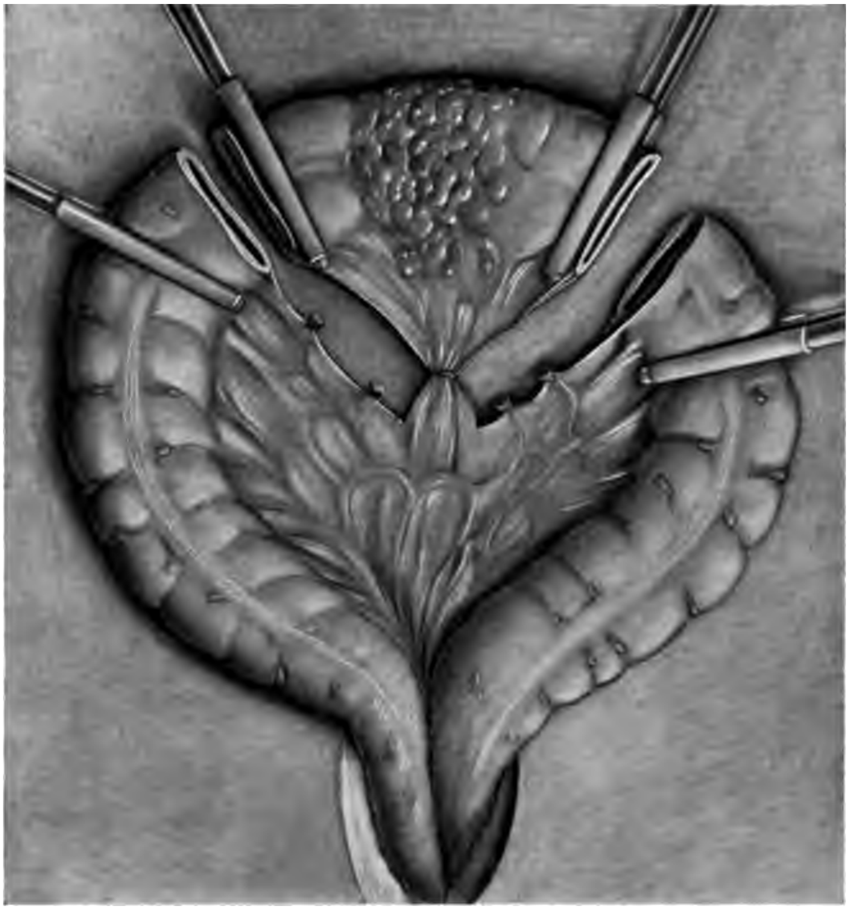

Fig. 161.—Showing method of clamping the bowel and dividing the mesentery.

Pagenstecher's celluloidin linen thread is employed for both the outer and inner sutures. The mesenteric wound is closed by a continuous through-and-through suture of catgut or linen, care being taken to ensure apposition at its juncture with the bowel and to avoid injury to the vasa recta and subsequent sloughing (Fig. 153). Bleeding from the intestinal or mesenteric vessels is controlled by adrenalin, powdered iron, hot-water compresses, ligatures, or by the introduction of one or more continuous or interrupted stitches.

When the ends of the gut are of unequal size, the peritoneal surface of the larger end is scarified and it is infolded and sutured until reduced to the proper size.

The success of circular enterorrhaphy depends principally upon placing the knots within the bowel, seeing to it that the dead space formed by the diverging layers of the peritoneum is obliterated, and reënforcing the inner with an outer or seromuscular suture line which dips down sufficiently deep to grasp the tough submucous coat.

Lateral Anastomosis (Short Circuiting).—Since Billroth first suggested this method of establishing a fistulous communication between two segments of the gut, the procedure has attained great popularity. Originally it was designed to afford relief in cases of intestinal obstruction which required the removal of a piece of intestine, but where the existence of ulceration, inflammatory deposits, dilatation or other pathologic conditions of the bowel near the obstruction rendered the gut unfit for resection and end-to-end anastomosis.

In recent years, the field of usefulness of this procedure has been materially extended, and it is now frequently resorted to in the treatment of both curable and incurable diseases of the stomach, as well as the small and large intestine.

Lateral anastomosis can be quickly performed, is devoid of danger, and has the advantage over end-to-end anastomosis or circular enterorrhaphy in that there is no dead space or wound in the mesentery to deal with, and healthy segments of gut can always be found for purposes of anastomosis.

Lateral anastomosis or short circuiting is most frequently resorted to under the following circumstances: (*a*) When anastomosis is desirable and the patient is in a critical condition; (*b*) when the ends of the bowel are of unequal size; (*c*) when the intestine is diseased and unsuited for end-to-end anastomosis; (*d*) as a substitute for circular enterorrhaphy, under favorable conditions; (*e*) to encourage the repair of ulcerative lesions by diverting the fecal current and giving rest to the diseased bowel; (*f*) in the operations of unilateral and bilateral exclusion and temporary drainage, in acute intestinal obstruction; (*h*) for establishing a fistulous communication between the bowel and the stomach or other viscus, and (*i*) to avoid colostomy.

In making a lateral anastomosis the surgeon may rely upon ***sutures alone***, or he may use one of the numerous mechanical appliances devised to aid him in the operation. Of the two procedures, the suture method should be adopted, except when there is some special reason for doing otherwise.

Lateral Anastomosis by Suture.—Briefly described, the technic of this procedure is as follows: After the segments to be united have been walled off with gauze handkerchiefs, they are stripped, clamped, and placed beside each other in such a manner that peristaltic movements will not be interfered with after they have been joined. Their peritoneal surfaces are then approximated by a continuous seromuscular suture for a distance of 4 to 5 inches, and the needle is laid aside.

The pieces of gut are then opened by 3-inch incisions, using the knife for the outer coats and the scissors for the mucosa, the cuts being made opposite the mesenteric attachment. With a cambric or curved surgeon's needle and silk or linen thread a suture is introduced at the angle of the wounds, including the adjacent walls of both segments, the end when tied being left long, to act as a tractor. The cut edges are then rapidly united by a continuous through-and-through whip, Connell, or other suture, and the two ends of the thread tied after the suture line has been completed.

The through-and-through suture when continuous should be *back-stitched* occasionally to prevent too much constriction, and should be so applied that the knot or knots when tied remain inside the bowel. When the inner suture has been installed, the needle carrying the continuous Lembert stitch is again taken up and carried around to the point of beginning, where it is tied to its other loose end in order to ensure accurate approximation of the peritoneal surfaces of the gut. The bowel is then cleansed and the gauze handkerchiefs and clamps are removed, after which the intestine is replaced and the wound in the abdomen closed.

When a lateral anastomosis is performed after intestinal resection, the technic differs from the above in that the divided ends of the gut are inverted and closed by a running or purse-string suture (Figs. 154–157) before they are placed beside each other to be united (*Medical Record*, Dec. 10, 1892).

Lateral Anastomosis with Murphy's Button.—When the button is used, after the ends have been closed and the first half of the seromuscular suture has been introduced, an oblong purse-string suture is then placed in such a way that when the bowel is opened the cut edge will be at least ¼ inch away from the thread (Fig. 158); or the bowel may be first incised and a through-and-through purse-string suture installed, after the plan of Murphy (Fig. 159). Held by forceps, the segments of the button are pushed into the ends of the bowel and retained there until the purse-string sutures have been snugly tied (Fig. 106). The forceps are then removed, the projecting edges of mucosa are trimmed off, and the button is locked fast by pressing the two halves together. The *beginning* or seromuscular suture is then continued around the bowel and knotted, the gut is restored to the abdomen, and the incision closed. A No. 3 button serves for the small bowel and a No. 4 for the large intestine. The advantages and disadvantages of the Murphy button and other mechanical devices have already been mentioned.

Lateral Anastomosis with McGraw's Rubber Ligature (*American Medicine*, Aug. 3, 1901).—This procedure has for its object the dividing of the partition between the joined pieces of intestine by pressure-necrosis induced by the ligature (Fig. 187). It is claimed for the McGraw method of anastomosis that it can be performed more quickly than others, and that there is less risk of infection because the bowel is not opened during the operation. This procedure is not desirable in cases of acute intestinal obstruction, because it does not permit of immediate drainage of the bowel after the anastomosis, as do the Murphy button and some other mechanical appliances. The steps in this procedure are the same as in other methods of lateral anastomosis up to the introduction and fastening of the ligature, which is accomplished as follows: A McLean needle, threaded with a small- (3 mm.) or medium-sized (4 mm.) rubber ligature, is made to take a 2-inch bite in the intestine (including all the coats), and when the ligature emerges it is knotted once and then carried across the seromuscular suture line, where a bite of equal size is taken in the other segment of gut, when the two ends of the ligature are snugly knotted (Fig. 187) and made fast by a silk ligature, which is tied over them to prevent their slipping; or two needles may be employed in placing the ligature (Fig. 187). The ends of the rubber are then cut short and with the ligature are buried by the continuation of the second half of the seromuscular suture. W. J. Mayo (*Annals of Surgery*, Nov., 1905) has called attention to a fact frequently observed that the McGraw ligature is not a desirable procedure to employ in patients with lowered vitality, because it may fail to cut its way out. One other objection which has been advanced against McGraw's anastomosis is that the ligature may be retained where the needle bite has not included the mucous membrane, a mistake easily committed by the novice.

End-to-side anastomosis (lateral implantation) consists in forming a juncture between the end of one piece of gut and the side of another. This procedure is more difficult of performance and is more often followed by leakage than end-to-end or lateral anastomosis, consequently it should not be practised except when there is a great disparity in the size of the segments of gut to be joined. Lateral implantation is most frequently performed where it becomes necessary to unite the end of the ileum to some part of the colon. The essential points in this procedure consist in splitting the end of the small bowel in order to increase the size of the opening between the joined segments of bowel; in making the implantation opposite the mesenteric attachment of the large gut; in effecting a decided infolding of the cut edges in order to bring the peritoneal surfaces together, and in attending to the mesenteric dead space. The anastomosis can be effected by sutures alone (inner and outer) or with the aid of the Murphy button, after the manner already described. Maunsell's technic is particularly well adapted to this type of anastomosis.

Prevention of Leakage During Anastomosis.—It is important to prevent soiling of the field of operation when the bowel is divided. This can be accomplished by stripping the intestine, clamping it, and encircling it with a gauze ligature, or by having the assistant compress it with his fingers. The use of clamps is the most satisfactory way, and they do no harm when properly covered with rubber tubing; four clamps should be at hand (Fig. 161), because this number is needed when a piece of gut is to be resected, but two will suffice where the bowel is divided but once, as is done in unilateral exclusion.

Many clamps are on the market; of these the ordinary circumcision clamp or those devised by Gould, Moynihan, or Doyen will be found serviceable. They should be applied obliquely and with moderate pressure at a distance of about 2 inches from where the bowel is to be severed (Fig. 161). The other methods of compressing the bowel mentioned above are undesirable, for the reason that the fingers of the assistant soon become tired and relax, while the application of the gauze ligatures necessitates injuring the mesentery.

Tractors.—Much time and annoyance can be saved both in end-to-end and lateral anastomosis operations by introducing two or more catgut, silk, or linen tractor stitches for the purpose of approximating the segments of bowel and steadying them while the sutures are being placed (Figs. 147, 148).

In concluding my remarks on end-to-end and lateral anastomosis, I would emphasize the importance of mastering some simple technic by experimental work upon animals, so that the operator becomes self-reliant and enabled to act rapidly, intelligently, and efficiently when confronted with the exigencies of a given situation.

ENTERECTOMY, COLECTOMY, CECECTOMY (TYPHLECTOMY), SIGMOIDECTOMY

Enterectomy, or the removal of a fraction of the intestine, is justifiable in both acute and chronic obstructions, where life is endangered and relief cannot be given in any other way. In the context the term "enterectomy" will be limited to partial resections of the small intestine, whereas the corresponding operations upon the large bowel, according to the topographic relations, will be discussed under the headings of cecectomy or typhlectomy, colectomy, and sigmoidectomy.

Resection of the small intestine is rarely performed for the relief of chronic obstipation, for the reason that the cause of this condition is usually located in the colon, sigmoid flexure, or rectum. In the treatment of chronic constipation or obstipation it quite frequently becomes necessary to remove a small or considerable portion of the large bowel or rectum, to free it from a tumor, stricture, foreign body, angulation, twist, diverticulum, adhesion, or other form of obstruction which blocks the passage of the feces.

I have resorted to this method of treatment with success on several occasions, and Lane (London) has resected the colon no less than 39 times for the relief of chronic constipation, with very good results. When engaged in doing a cecectomy, operators are often inclined to be conservative as regards the amount of bowel they remove, but this is frequently a mistake. It is far safer to take away a liberal amount of healthy gut than it is to leave even a small portion of diseased intestine, which might lead to cutting out of the stitches and peritonitis, the formation of a fecal fistula, or last but not least, a recurrence of the trouble.

A few years ago, in making an artificial anus, I brought outside the abdomen only a sufficient amount of gut to form a reliable spur and provide a useful opening. As a result, many of my colostomized patients suffered from protrusion of the rectum or descending colon through the artificial anus. In my last 200 colostomies I have excised from 3 to 15 inches of the gut to obviate this complication, and no ill consequences have followed.

Experiments upon animals have demonstrated that one-third of the small intestine may be resected without appreciable harm, but that, when as much as one-half or more of the small bowel is removed, digestive disturbances arise and death ensues from inanition. Surgeons have, on many occasions, removed from 5 to 12 feet of the small or large bowel, and their patients have recovered and lived in comfort afterward. (See author's case.) The following table of cases collected by Park (*Buffalo Medical Journal*, April, 1903) gives many examples of cases where several feet of intestine have been resected:

CASES OF INTESTINAL RESECTION WITH REMOVAL OF MORE THAN 200 CENTIMETERS OF INTESTINE

Operator.	Amount removed.	Result.
1. Koeberle	6 ft. 10 in. (205 cm.)	Recovered.
2. Kocher	6 " 11 " (208 ")	"
3. Dressman	7 " 2 " (215 ")	"
4. Shepherd	7 " 9 " (234 ")	"
5. Kukula	7 " 9 " (237 ")	"
6. Harris	7 " 10 " (239 ")	"
7. Hayes	8 " 4½ " (248 ")	"
8. Peck	8 " 5½ " (251 ")	"
9. Lawers	8 " 9 " (265 ")	"
10. Roswell Park	8 " 9 " (265 ")	"
11. Payr	9 " ½ " (275 ")	"
12. Maydl	9 " 4 " (284 ")	Died three weeks later of inanition.
13. Fantino	10 " 4 " (310 ")	Recovered.
14. Monprofit	10 " 4 " (310 ")	"
15. Ruggi	11 " (330 ")	"
16. Von Eiselsberg	11 " 8 " (350 ")	Death after twenty-five days.
17. Obalinski	12 " 2 " (365 ")	Died.

In cases 9, 11, 14, and 17, from 8 to 30 cm. of large intestine were included in the measurements given.

Moynihan, in discussing Park's cases, says: "The point of chief importance is, however, not so much the extent of the bowel removed, as the length of the bowel which remains. The result of many investigations by numerous observers goes to show that the total length of the bowel in man may vary between 15 and 33 feet. A patient whose intestine was 30 feet in length would, therefore, be able to submit to a more extensive resection than a patient whose intestine was only 20 feet, or perhaps less than this.

"This series of cases shows clearly enough that the extent of the resection may be very considerable without involving any such serious risk as one might expect. It emphasizes the point, upon which stress has already been laid, that a free removal of the bowel should be performed in any case where doubt exists as to its integrity."

In so far as the colon is concerned, it makes very little difference whether a short piece or several feet of the bowel is removed, because the ileum, to a great extent, takes upon itself the functions of the colon when the latter has been resected or excluded by entero-anastomosis.

My experience agrees with that of Lane, in that the stools following the last-named operations are at first frequent and fluid, but gradually become less frequent and, finally, normal in number and consistence. Under such circumstances the lower ileum, upon examination (2 cases of my own), was found to be enlarged and acted as a reservoir in which the feces remained until the watery constituents had been absorbed and the stools became formed and ready for expulsion.

Enterectomy, and most especially colectomy, is indicated more frequently in men than in women, and has been performed more than twice as frequently in persons between the ages of thirty and sixty than in older or younger individuals. In so far as the danger of resection is concerned, it makes very little difference how much of the bowel is removed. (See illustrative case, p. 430.)

On account of their great mobility, the small intestine, transverse colon, and sigmoid flexure are more easily resected than are the cecum and the hepatic and splenic flexures, which are always tied down deeply in the abdomen by their ligamentous attachments or short contracting adhesions, which makes their removal extremely arduous. It is invariably easier to resect a piece of the small bowel than a similar segment of the colon, because the latter is larger, thicker, more generously surrounded with fat, which delays the operation, and is often bound down by adhesions or a short mesocolon.

Except that a little more care is necessary in placing the mesenteric sutures following colonic resection, the technic of the following operations upon the small and large intestine is very similar, and should be carried out according to one of the plans elsewhere outlined. (See Intestinal Sutures and Anastomosis.)

The mortality following colectomy is very much greater when the operation is performed for the relief of cancer than for other types of mechanical obstruction causing obstipation, and the results are not so good. My more recent experience in the treatment of malignant neoplasms by resection encourages me to remove these tumors more frequently in the future than I have in the past.

In order to show the dangers and benefits to be derived from this operation in the treatment of cancer of the large bowel, I will quote fully the statistics of Moynihan (*Abdominal Operations*, second edition, pp. 434-437) upon this subject:

"*Statistics of Cases of Colectomy for Malignant Disease*

"I have collected the notes of 100 consecutive cases of colectomy for malignant disease from the recent literature. The following is an analysis of the cases:

"The sex is stated in 97 cases; of these, 56 were males and 41 females. The ages ranged from an infant of nineteen months to a man and woman aged seventy-five and seventy-six respectively.

"The greatest number occurred between the ages of thirty and sixty, as is shown in the following table:

“ Decade.	Male.	Female.	Total.
0–10	(1, sex not stated)		1
11–20	2	1	3
21–30	6	4	10
31–40	14	7	21
41–50	13	12	25
51–60	15	14	29
61–70	5	2	7
71–80	1	1	2
Total	56	41	98

“*Nature of Operation Performed.*—In 68 cases the growth was resected as a primary operation. In 56 of these, end-to-end suture was performed, with 16 deaths. In 2 end-to-end union was established and colotomy done at the same time. Both died. In 2 lateral implantation was practised with no deaths. In 7 union was effected by stitching up the free ends of the bowel and performing lateral anastomosis. Of these, 4 died. In 1 the growth was cut away and the ends of the bowel stitched into the wound, an artificial anus being left. This patient recovered. Thus, in 68 primary resections, there were 22 deaths, a mortality of 32.3 per cent.

“In 12 cases ‘Paul’s operation’ was performed, the growth being fixed outside the abdomen at the primary operation and cut away a few days later, leaving an artificial anus to be dealt with. In 1 of these an ileosigmoidostomy was established at the primary operation. Of the 12 cases 1 died—a mortality of 8.3 per cent.

“In 17 cases colotomy was done as a primary operation, the growth being left to be dealt with later. In 12 of these the growth was removed and union effected between the free ends of the bowel at one operation; 3 died (operation in two stages). In the remaining 5 the growth was excised by Paul’s method. None of these died (operation in three stages). Thus, of the 17 cases of colotomy with secondary resection, 3 died—a mortality of 17.6 per cent.

“In 3 cases ileocolostomy was done as the primary operation and followed by secondary excision; 1 died—a mortality of 33.3 per cent. The following table gives their statistics in brief:

“*100 Cases of Colectomy*

“ Primary excision.	Total.	Recovered.	Died.	Per cent. died.
1. End-to-end	56	40	16	28.6
2. End-to-end and colotomy	2	0	2	100.0
3. Lateral implantation	2	2	0	0.0
4. Lateral anastomosis	7	3	4	57·1
5. Artificial anus	1	1	0	0.0
Total	68	46	22	32·3

“ Secondary excision.	Total.	Recovered.	Died.	Per cent. died.
Growth brought out and cut away later	11	10	1	9.1
Growth brought out and cut away later and ileosigmoidostomy	1	1	0	0.0
Total	12	11	1	8.3
“ Colotomy and secondary excision.				
Operation in two stages	12	9	3	25.0
Operation in three stages	5	5	0	0.0
Total	17	14	3	17.6
“ Ileocolostomy and secondary incision	3	2	1	33.3
Grand total	100	73	27	27.0

“*After-history.*—Of the 73 cases which recovered from the operation, an after-history is given in 64: 6 had died—1 of apoplexy at the end of a month, 1 of a recurrence in two months, 1 of typhus fever in nine months, 2 of recurrences at the end of a year, and 1 of an acute chest trouble four years after operation. Thus, of the 6 deaths, only 3 were attributed to recurrence; 2 others had recurrences—1 at the end of two months, the other in six months. All the rest were well when reported and without recurrence, though in many cases the report was made only a few months after operation.

“ 1	reported	well at	end of	some	months.
7	“	“	“	2	“
3	“	“	“	3	“
1	“	“	“	4	“
3	“	“	“	5	“
2	“	“	“	6	“
3	“	“	“	7	“
1	“	“	“	8	“
3	“	“	“	9	“
1	“	“	“	10	“
7	“	“	“	1	year
4	“	“	“	1½	years
5	“	“	“	2	“
6	“	“	“	2½	“
4	“	“	“	3	“
2	“	“	“	4	“
1	“	“	“	5	“
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56					

“The 2 cases reported well at the end of seven years are those of Homer Gage and Hochenegg. They were a man and woman aged seventy-five and seventy-six respectively when operated upon.”

Patients upon whom a cecectomy, colectomy, or sigmoidectomy is about to be performed, should be prepared for the operation by freeing the bowel of accumulated feces (when possible), washing out the stomach, and rendering the skin of the abdomen aseptic.

General anesthesia is preferable for resection operations in chronic obstruction from all causes. When the condition of the sufferer is good, but if the bowel is completely blocked and the vitality is lowered because of enormous distention and absorption of virulent poisons, it is frequently advisable to open the abdomen and incise and drain the bowel under local anesthesia produced by the injection of a sufficient amount of a cocain solution (⅛ of 1 per cent.). When the location and type of the obstruction are known in advance, it should be reached and the intestine resected through an intermuscular or gridiron incision made directly over the lesion, but when there remains a doubt as to which part of the colon is blocked, a liberal median incision should be made and the cause and situation of the trouble carefully determined by examination, and then a second and more convenient cut may be made when required.

If, after it has been identified. the colon is found to be collapsed, it indicates obstruction in the small bowel, but when it is morbidly distended, this is evidence that the block is at some point in the colon or rectum. In the vast majority of cases of acute intestinal obstruction it is bad surgery to attempt resection and anastomosis under such circumstances. The patient stands a better chance of recovering from the operation and of ultimately obtaining a permanent cure when an immediate vent is provided for the contained feces, gas, and toxins, and the radical operation is postponed until later, when the patient's powers of resistance have been heightened. When opening of the bowel is contemplated, it should be brought outside and walled off after it has been freed from new exudates or firm adhesions with a gauze wipe or scissors. The distended bowel can then be quickly drained by means of appendicostomy, valvular cecostomy, colostomy, or by simply stitching a part of the colon (to be opened later) above the obstruction to the abdominal wall without any attempt at making a spur (simple enterostomy). Another popular way of obtaining effective and quick drainage is to divide the bowel and ligate each piece of intestine to one end of a Paul (*Brit. Med. Journal*, May 25, 1895, p. 1139) glass tube, to the other of which is attached a rubber pipe which carries the contents of the intestine to a vessel beneath the bed. When, for any reason, the surgeon does not wish to divide the bowel, it can be opened inside a purse-string suture, which is then tied around a Paul tube. In many cases the last-named procedure is the quickest and safest means of establishing immediate drainage in acute mechanical obstructions. Some surgeons advocate immediate incision and irrigation of the gut, while others prefer to empty the bowel by stripping it over a long glass tube similar to the one designed by Moynihan.

Resection of the obstructed segment of gut may be done, shortly following the establishment of drainage when conditions are favorable, or the operation may be deferred for weeks or months when the opening made serves to keep the patient comfortable and the bowel free from fecal accumulations. As a general rule, obstipation produced by the chronic forms of mechanical obstruction is not complete, and the establishment of temporary drainage is not imperative, consequently the causative disorder should be removed at the first operation by cecectomy. Naturally, cecectomy, colectomy, and sigmoidectomy are more dangerous when performed for the relief of acute than for chronic obstruction, because of the dangerous manifestations present at the time of operation. In fact, the operations named, when done for the relief of chronic mechanical obstructions, are not nearly as dangerous or difficult to perform as many surgeons, unacquainted with this fact, imagine them to be.

Following cecectomy and colectomy it is often necessary to cover over with peritoneum large surfaces of the posterior abdominal parietes which have been denuded of serosa, to avoid the formation of adhesions or hernia.

I have resected the cecum alone, or including a part of the colon, twice for cecal cancer, once for chronic irreducible ileocecal invagination, twice for otherwise inoperable adhesions, once for acute obstruction and multiple perforations caused by thread-like fibrous bands, and once for chronic volvulus caused by contracting adhesions which pulled its upper extremity in one direction and the lower in another—with but 2 deaths. In most of these cases, after the blind end had been formed in the colon, the ileum was severed, the divided ends closed, and an anastomosis made between it and the sigmoid or rectum. Considering the nature of the lesions and the condition of the patients at the time of operation, the results obtained from resection in these cases were very satisfactory. Except when adhesions are very numerous and firm or the bowel is pathologically altered, the removal of the cecum is not a very difficult procedure. Omental adhesions should be ligated and amputated rather than dissected off, in order to save time.

Cecectomy (typhlectomy) and sigmoidectomy are extremely difficult where the patient is fat, because of the thickness of the abdomen and the great amount of fat to be found in the mesentery and around the bowel. Naturally the most movable portions are more easy to resect than those which are fixed by the mesocolon.

Bleeding should be completely arrested before the abdomen is closed by suturing the raw or torn surface, or by applying the cautery, adrenalin, iron, or hot water to it until the hemorrhage has been controlled.

Postoperative adhesions may be forestalled by quick work, bruising the peritoneum as little as possible, clearing the abdomen of blood, covering denuded surfaces over with the serosa, aristol, tallow, or Cargyle's membrane, or by frequently changing the position of the patient. Eserin may be prescribed as a laxative to excite peristalsis and prevent inflamed or raw surfaces of the intestinal loops from remaining in contact for a considerable length of time. Except when there is some special reason for changing my technic, I prefer to remove the gut through a liberal median incision and to unite the bowel with end-to-end rather than lateral anastomosis. Pagenstecher's linen thread I regard as preferable to silk and the "sutures alone" method to mechanical devices.

The actual technic of anastomosing the bowel has not been given here because it has received sufficient attention already.

ENTEROSTOMY, COLOSTOMY, TYPHLOSTOMY OR CECOSTOMY, SIGMOIDOSTOMY

Enterostomy consists in anchoring the intestine to the outer abdominal wall or skin and opening it to provide immediate drainage in acute obstruction, or to form an artificial anus in cases of inoperable chronic obstruction.

Cecostomy (typhlostomy), colostomy, and sigmoidostomy are used to designate the operation when the cecum, colon, or sigmoid flexure are employed for these purposes.

The small intestine is rarely fixed and opened, and when it is, it is usually done for the relief of paralytic ileus or an enormously distended bowel filled with gas, feces, and virulent bacteria.

Enterostomy of the small bowel leaves the patient in a most deplorable condition, because of the almost incessant discharge of fluid feces, which is disgusting to the patient, keeps the skin about the wound in a constant state of irritation, and leads to malnutrition, because the chyme is discharged before its nutrient elements have been absorbed.

The colon, on the contrary, is quite frequently opened, either to give vent to the contents of an acutely obstructed bowel for the purpose of forming a permanent artificial anus or as a preliminary step to excision of the rectum.

Feces which reach the lower part of the colon are usually formed, while those of the cecum and upper part of the large bowel are fluid or mushy, consequently, when the bowel must be opened, a segment as low down as possible should be selected in order to save the patient much of the annoyance which would follow opening of the intestine higher up.

Simple enterostomy is a makeshift to carry the patient over a dangerous period in his illness, and the opening is not supposed to be lasting, but when an artificial anus is established, it is usually a permanent affair, consequently, the technic of these procedures must necessarily differ. In the former, no attempt is made to give the patient control over the evacuations, the object being to relieve distention and to provide a means of irrigation, so that the intestine may be cleansed of contained poisons. On the other hand, when a permanent anus is formed, pains are taken to make it effective, so that the patient will not be annoyed by involuntary movements or protrusion of the gut through the opening.

Simple enterostomy, or a fecal fistula, can be quickly and effectively made by freeing and drawing the segment of bowel situated above the point of obstruction up into the wound and stitching it all around with plain gut to the fascia or muscular layers. The stitches should be made to dip into the musculature of the intestine in order to give it a firm support. When the colon is opened, additional sutures should be introduced at the angles of the incision which will pass beneath the longitudinal band. When the manifestations arising from distention are not dangerous, the gut should not be opened for a day or two, but when the condition of the patient is critical, it should be punctured within a few hours, by which time the peritoneal cavity will have become walled off.

When it is imperative that the bowel should be opened immediately to save life, a loop of the intestine should be brought outside the wound, opened and ligated around a Paul's glass tube by means of a seromuscular purse-string suture, or the gut may be divided between clamps, and a tube placed in either end and made to connect with a basin under the bed by means of rubber piping. Experience has shown that fecal fistulæ heal more frequently and quickly when the intestine is fixed to the deeper abdominal layers than when it is stitched to the skin.

Colostomy. -Now and then it becomes necessary to colostomize patients suffering from chronic mechanical constipation induced by a growth, stricture, angulation, adhesion, volvulus, invagination, foreign body, diverticulum, or enteroptosis, after other measures have been tried and proved inefficient.

An artificial anus should never be made to relieve this class of sufferers except as a last resort, on account of the fact that patients seriously object to this procedure because the opening is in an abnormal position, they do not have perfect control over the evacuations, and further, because a second and more dangerous operation is necessary should they ever desire to have the artificial anus closed. When an inoperable stricture, growth, angulation, etc., causes obstipation and a new route must be found for the feces, I prefer entero-anastomosis and exclusion of the involved segment of gut to colostomy, because it relieves the constipated state, is not accompanied by the objectionable features of a colostomy opening, and does not require a possible secondary operation. An artificial anus may be *temporary*, when made as a preliminary step to excision and resection or until such times as the condition for the relief of which it was made has been cured, or *permanent*, when the opening is to remain through life.

In temporary colostomy the object sought is to keep the feces away from the field of operation for a few days before and following the interference, and then to close the opening; consequently, it is not necessary to spend as much time in the formation of a temporary anus as it is in the making of one which is permanent.

In permanent colostomy it is of the utmost importance for the patient's comfort to make the opening of a suitable size, and to do the operation in such a way that he may not be bothered with painful evacuations, complete fecal incontinence, or procidentia.

Formerly, there was considerable discussion as to which was the better procedure, *inguinal* or *lumbar* colostomy; at present, the latter has fallen completely into disuse, owing to its many disadvantages.

Practically all surgeons now locate the anus in the left inguinal region, except when the pathologic lesion necessitating the operation is situated further up in the colon, and then the outlet is made in the transverse colon or right inguinal region, according to the indications.

Except where there are special reasons for doing otherwise, the aperture should be made as low down in the large bowel as possible, because here the feces are more solid and give less trouble than when the anus is established at or near the cecum.

The majority of surgeons concentrate their efforts toward the formation of a proper spur and the production of the double-barrel-gun effect, to prevent any of the feces from reaching the rectum, but do comparatively little toward providing an anus over which the patient can exert a fair degree of control.

In recent years I [illegible] el, Tuttle, and the author have devised special technics designed to overcome the disgusting features of the old-fashioned anus, and each operator has met with more or less success.

The technic employed by the above-named operators has been given by me elsewhere (*Diseases of the Rectum and Anus*, third edition), and I need not do more at this time than briefly describe my own operation, which has proved eminently satisfactory in more than 100 cases.

The sigmoid is approached through a 2-inch incision which crosses a line extending between the umbilicus and the anterior spine of the ileum, at the inner border of the oblique muscles; working outward, the transversalis is separated from the internal oblique, with the index- and middle fingers, for the distance of about 1½ inches. The fingers are then forced upward through the two oblique muscles and then over the external oblique and inward to the incision, thereby separating the subcutaneous fat from the muscle. A loop of the sigmoid is now hooked up and then made to travel the route taken by the fingers, which makes it pass outward between the internal oblique and the transversalis muscles, and then through and over the external oblique to the incision (Fig. 162), where it is sutured after being made taut to avoid

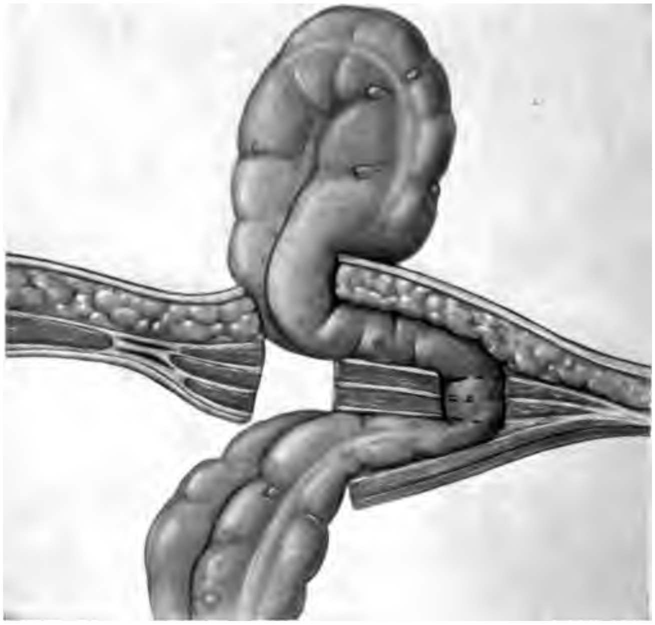

Fig. 162.—Showing the relation of the gut to the muscles, fasciæ, fat, and skin of the abdomen in the author's colostomy.

the possibility of subsequent procidentia. The angles of the wound are approximated by two chromicized catgut sutures, which pass through the skin and fascia on one side of the incision and then beneath the longitudinal band and out through the same structure on the other side, where they are tied (Fig. 163). After the gut has been attached to the skin by a few plain catgut stitches (Fig. 163), it is covered with rubber tissue lubricated with sterile vaselin to prevent sticking, and then the outer dressing and binder are applied. Patients have but little control over an artificial anus for the first few days, no matter what operation is performed, because the soreness of the wound and the irritability of the intestine excite frequent and strong peristalsis, with involuntary discharge of the feces.

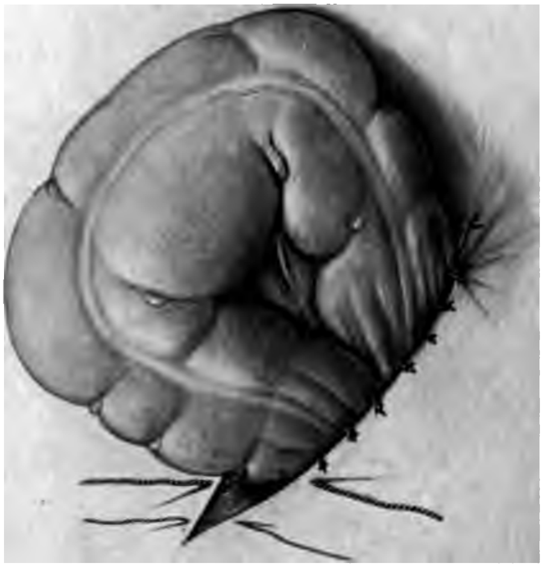

Fig. 163.—Showing side view of the gut after it has been brought out of the abdomen, and the method of applying the angular and fixation sutures in the author's colostomy.

Except during attacks of diarrhea I have rarely known a patient who had submitted to this operation to have more than one or two actions daily. In fact, I have treated many of my colostomized patients for constipation.

A study of the position of the gut as shown in the accompanying illustrations (Figs. 162, 163) will make it easy for the reader to understand why the operation is not followed by incontinence.

This procedure has the advantage over the Bailey, Weir, Witzel, and Tuttle technic, in that but one incision is made, while they make two, and further, because it gives the patient a more perfect control over the movements than do the others. My patients rarely complain of the involuntary escape of gas and usually do not have an evacuation until they desire, when they stimulate peristalsis by the injection of 2 or 3 ounces of warm water into the upper opening.

The bowel is not opened until after the third day, except when there is a marked distention which causes great suffering; under such circumstances it is punctured at any time after six hours and amputated later. The projecting piece of gut can be quickly and painlessly removed under local anesthesia induced by the injection of a small quantity of a $\frac{1}{8}$ of 1 per cent. solution of eucain into its mesentery. Cutting of the bowel proper causes no pain and does not require anesthetizing.

The bowel is amputated by a few bold cuts of the scissors about $\frac{1}{4}$ inch from the skin, to allow for retraction. Bleeding points are ligated en masse and hemorrhage from oozing surfaces is controlled by compresses wrung out of hot water, adrenalin, or a solution of iron, or the cautery. The raw edges left can be encouraged to heal rapidly by the occasional application of silver nitrate (6 per cent.). When the obstruction is located above the sigmoid, the steps in the operation must necessarily be modified to meet the indications, but the desirable changes in the technic will at once suggest themselves to the eye of the experienced surgeon.

CHAPTER XXXIV

INTESTINAL OPERATIONS (*Continued*)

Proctectomy. Closing of Artificial Anus and Fecal Fistula

PROCTECTOMY (EXCISION OF THE RECTUM)

CANCERS, strictures, polyps, or other diseased conditions which narrow or obstruct the lumen of the rectum should be resected along with as much of the bowel as may be necessary when their removal in a less radical manner is not feasible.

Excision of the rectum is most frequently practised in the treatment of cancer. My examination of the statistics shows that only about 65 per cent. of these growths are operable and that about 16 per cent. of this number live three years or longer. The mortality following superior proctectomy (Kraske's operation) is 21 per cent., and inferior proctectomy (perineal excision) equals $7\frac{5}{10}$ per cent.

Of rectal cancers approximately 95 per cent. are of the cylindric-celled (adenomatous) variety, whereas 5 per cent. are of the squamous-celled (epitheliomatous) type; the former being located in the rectum proper and the latter at or near the anus.

In 100 anorectal cancers examined by me (Fig. 164), the neoplasm was located in the ampulla in 50 per cent.; upper rectum, 20 per cent.; upper rectum and sigmoid, 15 per cent.; anal canal, 10 per cent., and at the anus in 5 per cent. of the cases.

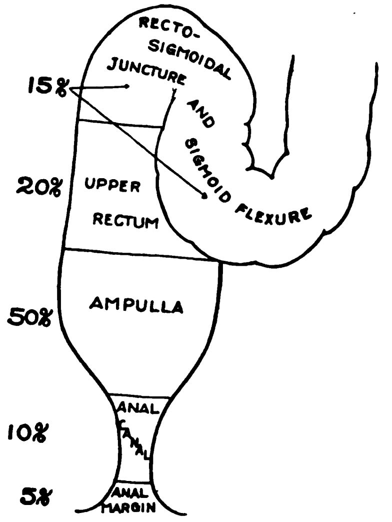

Fig. 164.—Showing the localization of cancer of the lower bowel in 100 cases examined by the author.

The rectum may be excised by inferior, superior, vaginal, or celio-proctectomy, and proctectomy by invagination. Elsewhere (*Diseases of the Rectum and Anus*, third edition) I have described the methods employed in doing these operations by various surgeons of repute; consequently, it is not necessary to do more at the present time than to describe my own technic.

It is my custom to keep this class of patients in the hospital for from three days to a week prior to the operation in order that the bowel may be cleared. For the first few days cathartics are administered daily and enemata if indicated, but laxatives of all kinds are discontinued twenty-four hours before the operation, and during this time catechu or morphin are administered to tie up the bowel and prevent the possibility of annoyance from the discharge of fluid feces during the operation. Careful attention is also paid to the preparation of the skin of the anosacral region or abdomen, or both, according to the nature of the operation to be performed.

Inferior Proctectomy (Lisfranc's Operation, Perineal Excision of the Rectum).—Inferior proctectomy is performed by me as follows: The patient, prepared and anesthetized, is placed in the lithotomy position, with legs flexed upon the abdomen and buttocks projecting over the end of the table. The external parts and the rectum are thoroughly cleansed, and in male patients a sound or silver catheter is introduced into the bladder as a guide against injuring the deep urethra. The sphincter muscle is divulsed with the thumbs and the anus everted with forceps. The bowel is now completely divided by a circular incision made immediately above the external sphincter, and the rectum above the incision freed sufficiently to be grasped with four long-handled T-shaped forceps, one on each of its sides, and held by an assistant.

In order to gain the necessary room for dissection, a probe-pointed bistoury is pushed, with its flat side toward the bowel, upward for a distance of 2 or 3 inches (5.08–7.62 cm.) through the cellular tissue immediately behind the rectum; the knife is then directed backward and withdrawn, dividing in one stroke all the soft parts, including the sphincter, back to the tip of the coccyx, and leaving a deep, triangular wound.

The traction-forceps are now grasped in the left hand and the rectum held first to one side, then to the other, while it is freed from its attachments by dissections made with the finger, the handle of the scalpel, or blunt scissors. Sharp-pointed scissors or the knife should not be used for this purpose on account of the danger of buttonholing the bowel, urethra, or vagina. The rectum can be loosened more rapidly from its posterior than from its anterior attachments because of its close relations with the bladder, urethra, prostate, or vagina.

When the dissections have been carried above the growth, the bowel is drawn downward as far as possible and amputated, the proximal end being grasped with forceps to prevent retraction. Spurting vessels are ligated and oozing arrested by packing the wound with gauze compresses wrung out of hot water. If possible, the proximal end of the bowel is now brought down and united to the distal end by interrupted catgut or silk sutures passed through the entire thickness of the gut wall. I have also successfully employed Hochenegg's method of denuding the mucosa of the anal segment, pulling the gut down through the latter, and suturing it to the skin about the anus. When feasible, one of these operations should be selected because they preserve the sphincter muscle and thereby avert incontinence. The ends of the divided sphincter muscle are approximated by means of buried catgut sutures, and a gauze drain is inserted in the posterior wound, which is then closed by a continuous suture. Primary union is seldom obtained, owing to tension, and consequently more or less retraction follows.

In most instances, especially when a large growth has been removed, it is impossible to bring the end of the rectum down to the anal segment. In such cases the bowel should be packed with gauze and the entire wound be left to heal by granulation. Dressings are now applied and held in place by a properly adjusted T-bandage. The entire operation should not require more than twenty or thirty minutes.

When the growth is sufficiently low down to involve the sphincter muscle, the circular incision is made through the skin at least ½ inch (1.27 cm.) to the outer side of the anal margin; the rectum is then isolated, the diseased portion amputated, and the end of the bowel drawn down and sutured to the skin.

Inferior proctectomy is performed *only* when the growth is in the lower 3 inches (7.62 cm.) of the rectum. For this reason the peritoneum is rarely injured. Should such an accident occur, however, the life of the patient is not greatly endangered, provided the peritoneal wound is immediately closed with fine catgut or the cavity drained with gauze.

The patient should be kept quiet and restricted to a light diet until after the first week. The dressings are removed on the fourth day and an action of the bowels is secured. Thereafter the rectum should be emptied every two or three days and then irrigated. Fresh dressings should be applied after each stool and as often as they become soiled by the discharge. Owing to retraction and cicatrization the lumen of the bowel becomes narrowed in most of these cases. To prevent this, the finger or a rubber bougie should be introduced into the bowel at intervals of a few days for at least six months after the operation. Cicatrization not infrequently draws the proximal end of the rectum downward toward the anal segment, and, when the interval is narrow, the mucosa may become continuous. In one case prolapse of the mucous membrane is said to have followed the operation.

The following are the chief *disadvantages* of inferior proctectomy:

1. It is applicable to only a small percentage of malignant tumors of the rectum which are located near the anus.

2. Resection and end-to-end anastomosis are rarely possible by this procedure.

3. Last, the working space is so limited that, when the growth proves more extensive than was anticipated, and serious complications are encountered (injury to the bladder, etc.), the operation must frequently be abandoned and the neoplasm delivered by the vaginal or sacral route.

Superior Proctectomy (Kraske's Operation; Sacral Excision of the Rectum). The term *superior proctectomy* is applied to all operations of excision and resection of the rectum wherein the bowel is approached from behind and dissected out from above downward. In order to accomplish this object it is sufficient in some cases to remove only the coccyx (through a posterior median incision); in others a portion of the sacrum must be included (Fig. 165) or an osteo-integumentary flap formed and replaced after the bowel is excised (Fig. 166). When the sphincter is not involved, it is desirable to preserve this muscle; if, however, the disease extends to the anus, the lower rectum must be amputated and a sacral anus established. For these reasons, no *one* method of performing superior proctectomy is practicable in all cases. On the contrary, the operation must be modified to suit the case under consideration.

This operation is performed by me after the following method, which embraces many of the practical points suggested by Kraske and other surgeons, who have modified this operation, together with a few of my own:

The patient, previously prepared and anesthetized, is placed on a low table, on his left side, with legs flexed upon the abdomen, body inclined to the right until almost face downward, and the pelvis raised by means of sand-bags. The outer parts are thoroughly scrubbed and cleansed, and the rectum irrigated, dried, and packed loosely with gauze (or the anus sutured) to prevent soiling of the wound.

Beginning at the posterior superior spine of the ileum on the left, an incision is made just external to, and following the curve of, the left border of the sacrum and continued downward to the tip of the coccyx. From this point it is carried down in the median line to the border of the sphincter muscle. A second incision is then made through the soft parts just below the lower margin of the *third sacral foramen*, extending from the first cut across the sacrum and a little beyond the right edge of the bone. The flap thus formed is dissected up from the bone (unless an osteo-integumentary flap is to be made) by a few rapid strokes of the knife and turned back to the right, exposing the sacrum and coccyx.

The tip of the coccyx is freed and then grasped and lifted up with strong *spiked* forceps, held in the left hand. The lateral attachments of the sacrum and coccyx, both muscular and ligamentous, including the lesser and a portion of the greater sacrosciatic ligaments, are rapidly divided up to the transverse skin incision by means of the author's heavy blunt scissors. The soft parts are stripped off the anterior surface of the coccyx and lower portion of the sacrum with the handle of the scalpel or the finger, care being taken to avoid injury to the sacral vessels and consequent hemorrhage. The lower part of the sacrum with the coccyx is now removed by dividing the sacrum from left to right with bone-forceps just below the level of the third sacral foramen, which exposes the rectum. Spiculæ of bone are removed and a pad of gauze placed over the sharp end of the bone to protect the hand from injury while separating the rectal attachments from the hollow of the sacrum. If the bone bleeds freely, pressure may be made over the gauze compresses by an assistant.

The exposed bowel is now rapidly separated from its lateral attachments with the finger and handle of the scalpel. More time and care are necessary to free the gut from its anterior attachments because of the insertion of the levator ani muscle and its close proximity to the vagina, urethra, and prostate. Blunt scissors are usually required to dissect the bowel from the muscles and other structures in front. For this reason a sound should be introduced into the urethra, or the finger inserted into the vagina from time to time, in order to ascertain how close the dissections are being carried to these organs and to serve as a guide to avoid injuring them.

The rectum is then separated from its sacral connections to a safe distance above the upper margin of the growth, which is determined by rolling the bowel between the fingers. While making the posterior dissections, extreme care must be taken not to injure the sacral or the hemorrhoidal vessels, in order to avoid troublesome *hemorrhage* and to preserve the *nutrition* of the rectum after operation. If blunt scissors are used, they should be directed backward toward the sacrum and the dissections carried as near the bone as possible. After the bowel has been completely isolated sufficiently high up, the packing is removed from the rectum, which is again thoroughly cleansed and dried.

Gauze is then placed under the bowel to protect the wound. The diseased portion is resected (between ligatures placed above and below the growth), the incisions being made at least ½ inch (1.27 cm.) from the upper and lower limits of the neoplasm. The proximal end of the bowel is then brought down and united to the distal segment by circular enterorrhaphy (Fig. 165). For this purpose ordinary sewing needles and black silk thread are used. The Murphy button may be employed when the resection is *high* up; but lower down, where the bowel is devoid of peritoneum, union will not follow its use.

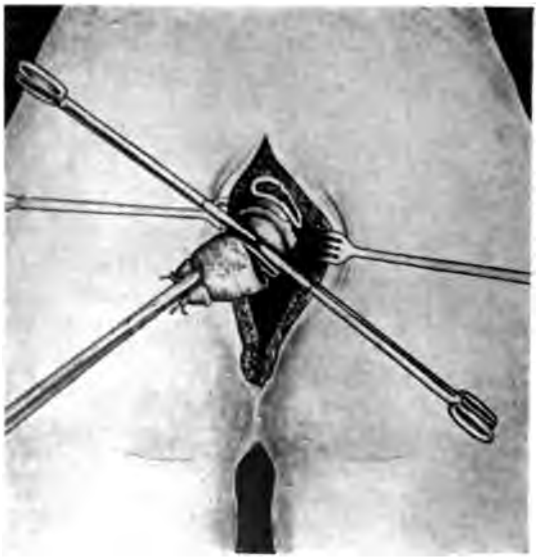

Fig. 165.—Showing method of amputating the rectum after it has been freed from its attachments in superior proctectomy.

Bleeding, which is profuse at first, diminishes in the further course of the operation, but few vessels requiring ligature, except those cut when the bowel is divided. Troublesome oozing can be readily controlled with gauze compresses wrung out of hot water and pressed firmly into the wound.

When possible, the growth should be removed *without opening the peritoneal cavity*. In most cases, however, owing to the extent of the disease or its high location, the peritoneum must be divided in order to resect the growth and liberate the bowel sufficiently to bring the proximal end down to unite it to the distal. To accomplish this it sometimes suffices to sever the lateral peritoneal attachments; but it may be necessary to separate the peritoneum from *all sides* of the rectum. In such cases the ***mesorectum*** binding it to the sacrum should be ***divided as far as possible from the bowel***, in order to avoid severing the nutrient vessels. After the anastomosis has been completed, if the field of operation is clean, the peritoneum should be stitched to the serous coat of the bowel; if there is danger of infection, the peritoneal cavity may be drained with gauze.

The wound is now irrigated and gauze placed about the bowel to insure free drainage. The skin-flap is replaced and sutured, allowing space for the gauze drains (Fig. 167). The rectum is loosely packed with antiseptic gauze to protect the wound within the bowel, while dressings are applied to the external wound and secured with a T-bandage. The patient is placed in bed, with instructions to the nurse to keep him quiet, administering opiates if necessary. When the growth is low and it can be extirpated by removing the coccyx only, I prefer the posterior median incision of Kocher.

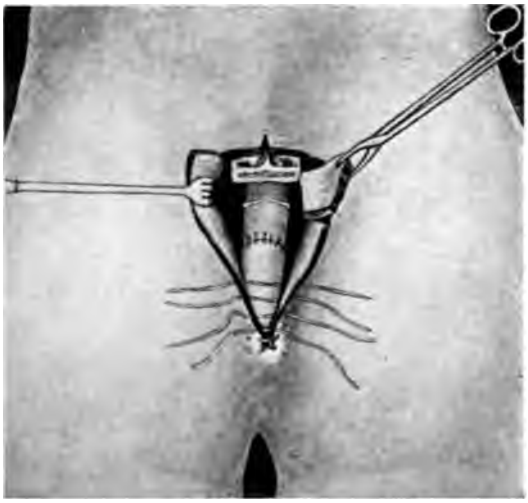

Fig. 166.—Showing bony integumentary flap held back while the growth is removed and an end-to-end anastomosis is made in superior proctectomy.

When it is desirable to form an ***osteo-integumentary flap***, the same preliminary incisions are made. The ligamentous and muscular attachments are severed on the ***left side*** of the sacrum and coccyx up to the transverse skin incision and also from the tip and anterior surface of the coccyx. The sacrum is divided on a line just below the third sacral foramen as before described, and the bone and attached soft parts turned back to the right (Fig. 166) and held by an assistant. The rectum is then amputated or resected, after which the flap is restored and sutured. This temporary resection of the sacrum is not always desirable, because of the great difficulty of draining the wound after the bony flap has been replaced, and, unless the surgeon is confident that there is little danger of infection, the bone should not be restored.

Owing to this serious difficulty of guarding against infection after temporarily turning aside the bone, in certain cases I resect the coccyx and lower portion of the sacrum and form a sacral anus (Fig. 167). My patients have not complained of any very great inconvenience from the deformity caused by permanent removal of these bony structures, but at the same time I consider the *unnecessary* removal of any part of the pelvic support inadvisable.

The *method of dealing with the bowel* after the growth has been excised varies greatly in different cases, depending upon the location and extent of the disease. In uniting the ends of the bowel by circular enterorrhaphy, as above described, the surgeon frequently meets with great difficulty in placing the posterior stitches, because of the tension upon the bowel and the limited space in which the work must be done. To overcome this disadvantage, I have in some cases employed the method suggested by Hochenegg, invaginating the lower segment of the gut through the anus and drawing the proximal through it sufficiently to permit the ends of the rectum to be approximated and sutured, after which the bowel is returned. Where this is feasible, the anastomosis can be made more quickly and accurately than by the usual method.

Circular enterorrhaphy is very often followed by the formation of a *posterior* fecal fistula. To obviate this complication, I have frequently resorted to Hochenegg's plan, known as the "pull-through" method, which consists in denuding the anal segment of its mucosa and pulling the proximal end down through the denuded gut, where it is sutured to the skin around the anus. This procedure does not interfere with the function of the sphincter muscle.

When a malignant growth involves so much of the bowel that its removal renders an end to-end anastomosis impossible, or prevents the proximal end of the gut being brought down and stitched around the anus, a sacral orifice should be formed by stitching the proximal end to the margin of the wound below the end of the sacrum (Fig. 167). This is a quick and safe procedure.

When the disease extends downward and involves the anus, it is impossible to preserve the sphincter muscle. In such cases the *preliminary incision* is carried down and made to encircle the anus, as for inferior proctectomy; the rectum is then dissected out, amputated well above the growth, and the proximal end of the bowel brought down and sutured to the skin around the circular incision. When this is not possible, a sacral anus is formed (Fig. 167). If the end of the gut is encircled with a purse-string suture of catgut before attaching it to the skin, fewer stitches are required and a smaller opening is left.

The incontinence which invariably follows extirpation of the sphincter muscle may be lessened in degree, but not entirely averted, by twisting the bowel, as suggested by Gersuny, or by bringing it out between the fibers of the gluteus maximus muscle and uniting it to the skin, as recommended by Willems, Jaennel, and Witzel.

In order to prevent the straining incident to defecation, to lessen the danger of infection of the wound from the feces, and to avert the formation of a fecal fistula, Schede, Quénu, Keen, and many other leading operators advocate *preliminary colostomy* and amputation or resection of the growth at a later date. I am heartily in accord with these surgeons, and would advise preliminary colostomy, especially in those instances in which the growth is extensive, located high up, and leaves a considerable distance between the ends of the bowel when removed. This operation is also indicated in cases in which it is desirable to extirpate the entire rectum. The mortality, immediate and remote, is certainly less when the radical operation is preceded by the establishment of an artificial anus.

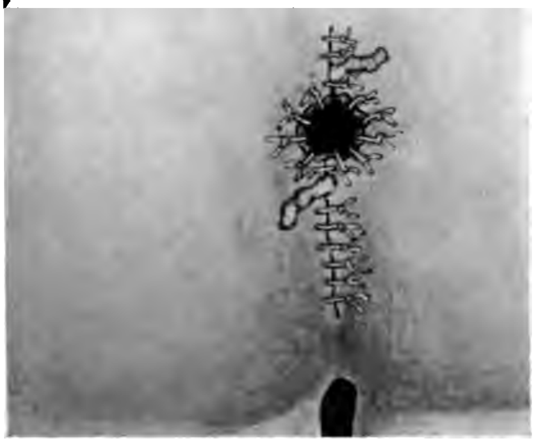

Fig. 167.—Showing appearance of wound and location of the sacral anus after superior proctectomy.

The *after-treatment* following posterior proctectomy does not differ materially from that already given for inferior proctectomy. The diet should be light for the first few days and the feces kept soft. Most important of all is proper drainage of the wound.

I would emphasize that success in *superior proctectomy* depends mainly upon observance of the following points in the technic:

1. Preserve the nerves and ligamentous and muscular attachments as far as possible, and in order to prevent pelvic deformity remove *only* the necessary amount of bone.

2. If possible, leave the external sphincter intact, to prevent incontinence.

3. When isolating the rectum avoid hemorrhage and protect the nutrient vessels by severing the mesorectum close to the sacrum.

4. Diminish the danger of peritonitis, where feasible, by extirpating the growth without entering the peritoneal cavity.

5. Free the bowel sufficiently to avoid tension and accurately approximate the upper and lower end; otherwise leakage may take place between the sutures or the stitches may cut out, causing fistula.

6. Thorough asepsis should be observed throughout the operation. The operative field should be kept clean and the peritoneal cavity protected by stitching up the anus or packing the lower rectum with antiseptic gauze. The finger should be introduced into the bowel only when absolutely necessary, and when feasible the peritoneal cavity should be closed before the bowel is opened.

7. When an osteo-integumentary flap has been formed, it should be replaced, but not sutured, if there is any reason to believe that the wound has been infected.

8. Provide thorough drainage for every part of the wound.

The following are a few of the beneficial results which may be derived from *proctectomy*, either superior or inferior:

1. It effects a cure in 16 per cent. of properly selected cases.

2. In case of recurrence, patients usually live considerably longer than if the operation had not been performed.

3. As a palliative procedure it relieves obstruction; stops straining, diarrhea, bleeding, and odor; does away with pressure-pains, and relieves the pruritus incident to the excoriations caused by contact with the irritating discharge.

4. It encourages a class of sufferers who otherwise would have been condemned to a miserable existence and a speedy death to hope for a new lease of life.

5. The sequelæ of the operations are sometimes annoying, but pain

from this source does not begin to compare with the suffering which would have ensued had the operation not been performed.

6. The mortality (21 per cent.) following the operation is not sufficiently high to warrant the timid surgeon in refusing other than palliative measures to these sufferers who, in the hands of a bolder operator, would be given a chance for their lives.

Vaginal Proctectomy.—When a malignant growth is located within 3 to 5 inches (7.62–12.70 cm.) above the anus in the female, it will be found advantageous to amputate or resect the rectum by the vaginal route, since this operation avoids bony mutilation and destruction of the pelvic support. The operation can be performed in a comparatively short time. The mortality following it is very small.

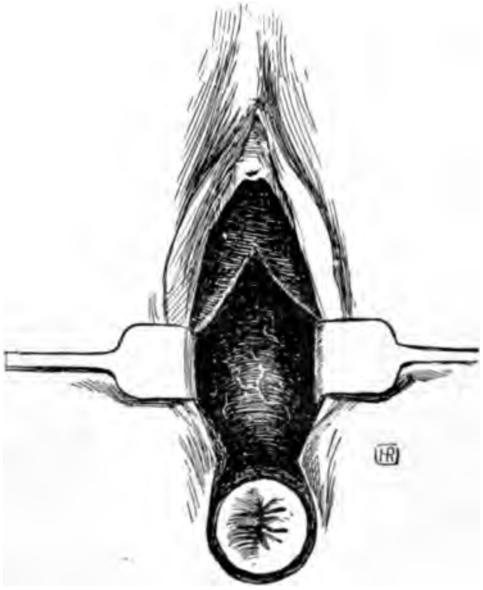

Fig. 168.—Proctectomy by the vaginal route: First step.

The operation is performed in three steps, as follows:

1. A longitudinal median incision of sufficient length is made in the posterior vaginal wall and carried down through the perineum. If this does not give sufficient room, a transverse incision is made just below the cervix, and the flaps are turned to either side (Fig. 168).

2. An incision is made encircling the anus ½ inch (12.70 mm.) or more from its margin. The rectum is then freed from its attachments, brought forward through the vaginal incision, dissected upward beyond the growth, and the lower bowel amputated (Fig. 169).

3. The remaining end of the rectum is brought down and sutured to the skin around the circular incision, the vaginal wound is closed with silkworm, wire, or catgut sutures (Fig. 170), and dressings applied.

When possible, the sphincters should be preserved, and an end-to-end anastomosis made in the manner described in discussing superior and inferior proctectomy. When the disease has destroyed the lower rectum, the proximal end should be twisted, as suggested by Gersuny, before attaching it to the skin, in order to produce partial continence of feces. The peritoneum when injured may be drained by means of gauze placed behind the rectum or introduced through the vagina; or, if there is little danger of infection, it may be closed by suturing it to the bowel.

I have performed vaginal proctectomy in 6 selected cases,[1] and have been much pleased with the operation. In my opinion, it should take precedence over the operations of Kocher and Kraske in all cases in which the growth is so situated that it can be removed from in front.

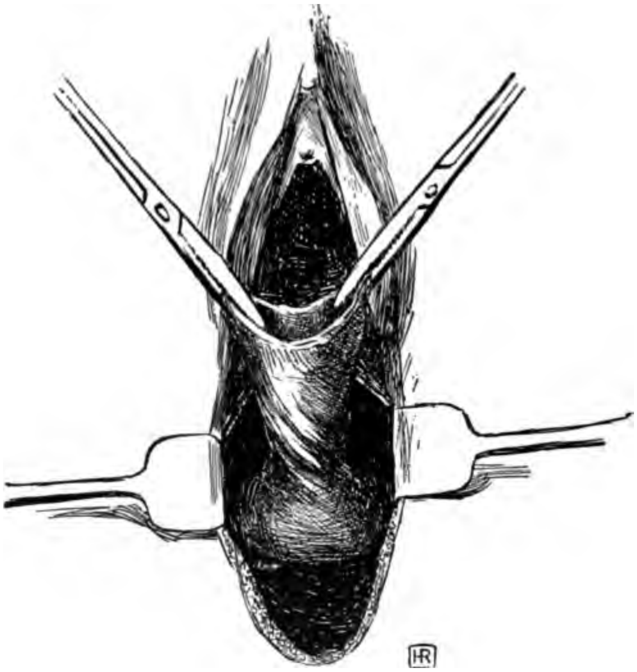

Fig. 169.—Proctectomy by the vaginal route, showing Gersuny's twist: Second step.

The advantages of vaginal proctectomy are tersely given by Murphy, as follows:

"1. The sacrum and posterior bony wall of the pelvis are not disturbed.

"2. The field of operation is extensive, and the anatomic parts are as accessible as in the transsacral operation.

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[1] These operations were performed before January, 1905. Since then I have performed other operations of the same kind.

"3. The peritoneal cavity is opened in both the vaginal and sacral operations, and in neither is it a source of great danger.

"4. The diseased tissue is more accessible for inspection, and the extent to which an operation may be carried in an upward direction is as great, if not greater, than by the sacral route.

"5. The peritoneum may be drained freely through the vagina.

"6. A perfect end-to-end approximation, either by suture or by the use of the button, may be secured. The preferable method of uniting the two ends is by interrupted sutures of silk; as there is no peritoneum on the sphincteric segment, the danger of failure of union with the button is present.

"7. The sphincter is retained and the perineal body is restored. There is diminished action of the levator ani muscles.

"8. When the operation is complete, the parts are practically in their normal positions."

When feasible, **malignant neoplasms located in the upper rectum and sigmoid** should be invariably removed through an *abdominal incision* rather than by superior, inferior, or vaginal proctectomy, because in this procedure less time is required, complications are fewer, the permanent results are just as good, and there is much less danger of shock, hemorrhage, peritonitis, sloughing of the bowel, and fecal fistula following the operation. Again, if the growth is removed through the abdomen, there is no mutilation of the ligaments, muscles, and bones which support the pelvis; and last, but not least, the sphincter muscle is preserved and the patient does not suffer from fecal incontinence, but, on the contrary, has perfect control of his stools, which are voided through the natural channel instead of a sacral anus.

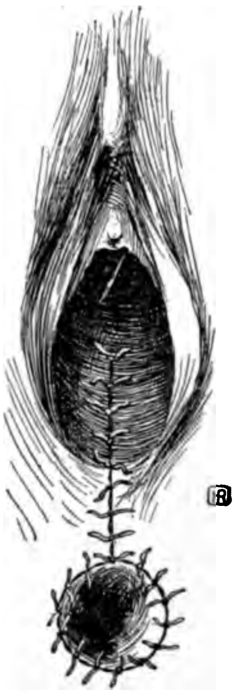

Fig. 170.—Proctectomy by the vaginal route: Third step.

In those instances in which the growth is so low down that it cannot be drawn up into the wound for resection, the *peritoneum* should be divided anteriorly and laterally. When necessary the mesorectum may be severed, but always at a safe distance from the bowel, in order to avoid injury to the vessels.

The proximal and distal ends of the bowel may be approximated by means of circular enterorrhaphy or the Murphy button; or a lateral anastomosis may be made by using the button or a fine silk suture and a straight needle. The abdominal incision is then closed, leaving room for a drain when needed.

When the growth is so situated that it cannot be dissected out from above or below, it should be removed by *laparoproctectomy.*

Laparoproctectomy (**Celioproctectomy, Abdominal Perineal Excision**).—This term is applied by me to an operation in which it is necessary to attack the diseased rectum from above through an abdominal incision, and also from below by means of superior, vaginal, or inferior proctectomy, in order to free the bowel and extirpate the growth. Such an operation is indicated when the malignant neoplasm is so situated in the upper rectum and sigmoid flexure as to render impossible its removal either by laparotomy or proctectomy alone.

The technic of laparoproctectomy is as follows: The abdomen is opened by a free incision in the left inguinal region about 2 inches (5.08 cm.) to the inner side of the anterior superior spine of the ileum. The growth and sigmoid flexure are located, and the latter lifted upward through the wound. The sigmoid is then divided between ligatures, and the upper end handed to an assistant to hold, while adhesions and mesosigmoid and mesorectum are being ligated and divided in successive stages. Next the peritoneum is severed on all sides and the diseased bowel pushed below.

The patient is now placed in a suitable position and the rectum is detached from its surroundings by means of superior, inferior, or vaginal proctectomy and removed, except when the lower rectal segment is left to be anastomosed with the sigmoid when it is not involved in the disease.

Finally, the proximal end of the sigmoid flexure is sutured to the skin in the sacral region (Fig. 167), to the anus, or to the remaining portion of the rectum, according to the exigencies of the case.

The results which have followed this combined operation in my hands have been very satisfactory, and I cannot help but believe that this procedure will be more generally practised when its good points become better known.

Proctectomy by Invagination.—This operation consists in making an artificial prolapse or invagination of the rectum by drawing the latter down or out through the anus, when the growth is excised or the diseased bowel resected. Proctectomy by invagination is applicable to only a small percentage of cases of malignant tumors of the rectum, because most of these neoplasms are located so high up and are so large or so firmly attached to the perirectal structures that it is impossible to invaginate the growth through the anal orifice.

The operation is especially adapted, however, to the removal of single or multiple cancerous nodules occurring in the rectal wall in the earlier stage of the disease, before adhesions have formed. In such a case the nodule is seized with strong traction-forceps, pulled well down below the anus, then excised by an elliptic incision, and the resulting wound immediately closed with catgut sutures or allowed to heal by granulation. This operation is desirable in extirpating these nodules, because but a narrow longitudinal strip of the bowel is removed and sufficient mucosa is left to obviate the danger of stricture.

In a few cases growths involving the entire circumference of the bowel have been removed by invagination and resection of the diseased portion, the cut ends of the gut being united by end-to-end anastomosis with continuous or interrupted silk sutures.

In 4 cases I have succeeded in removing a malignant growth of the rectum by the invagination method. In one of these patients, a female, the growth was about the size of a small lemon and situated in the anterior rectal wall, 2 inches (5.08 cm.) above the anal orifice. It was turned out through the anus by the middle and index-finger inserted into the vagina. To prevent retraction the bowel was grasped with forceps on either side of the growth and held by an assistant. The growth was then extirpated by making an elliptic incision, and the wound was closed by interrupted catgut sutures. There was no recurrence at the end of three months, when the patient passed from under observation.

CLOSURE OF ARTIFICIAL ANUS

It is very much more difficult to close an artificial anus where the legs of the loop removed have grown together and formed a spur than it is to close a fecal fistula. An artificial anus may be closed by dividing the spur with an enterotome suggested by Dupuytren, a clamp, or a ligature, and uniting the skin above, or by freeing the gut from the abdominal wall and anastomosing the divided ends of the intestine by means of lateral or end-to-end anastomosis. Joining the severed ends of gut under the circumstances is difficult and somewhat dangerous, because asepsis of the bowel is difficult to obtain, and further, because the gut adjacent to the opening is considerably thickened. In most instances, except when there is some special reason for doing otherwise, I prefer first to divide the spur by pressure-necrosis and then to unite the skin edges over it.

Author's Clamp Operation.—Some years ago I invented a clamp (Fig. 225) which has proved extremely useful in the closure of colostomy ope[illegible] T[illegible]nstrument is used in the following manner: Its weight is imperceptible to the patient, and when in place, the shank, which is bent at an angle to the clamp, lies flat upon the abdomen. The jaws of the clamp are fenestrated, ½ inch (1.27 cm.) broad, and 1¼ inches (3.18 cm.) or more in length. The clamp is applied by means of the author's applicator forceps (Fig. 226), as follows: It is placed in the applicator or strong angular pressure-forceps, and so adjusted that its jaws are open to the fullest extent. The parts having been thoroughly cleansed, the spur is carefully stripped with the fingers in order to remove any coil of the small intestine which might otherwise be included in the angle of gut below it. The clamp is then applied, one blade in each opening (Fig. 171), and pushed down sufficiently to include the entire spur (Fig. 171), when it is released from the instrument. It is allowed to remain *in situ* until it comes away unaided, which is usually from six to nine days later, depending upon the amount and character of the tissue to be removed. The clamp causes slight soreness, but no acute pain. To avoid complications, the patient must remain quietly in bed until it sloughs out. When the spur has been successfully destroyed, the skin and edges of the opening should be freshened and closed with catgut or silk sutures (Fig. 172). If there is considerable tension, the wound should be drawn together and supported by well-

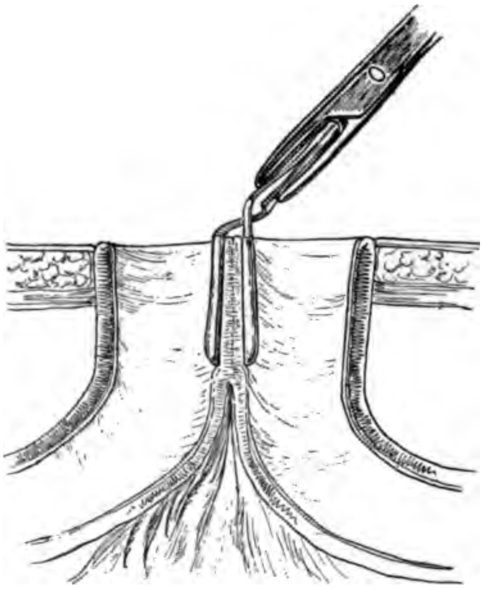

Fig. 171.—Method of applying the author's colostomy clamp (Fig. 225) in the closure of an artificial anus.

adjusted adhesive straps. I have successfully performed this operation several times and prefer it to closure by anastomosis because it requires very much less time, the peritoneal cavity is not opened, and danger from peritonitis is avoided.

Resection and Anastomosis.—The clamping operation is preferable, but when for any reason it is contra-indicated, the most satisfactory manner of closing the artificial anus is to reëstablish the normal channel by resection and anastomosis.

The *technic* of this operation is as follows: After the parts have been cleansed and the opening in the bowel has been closed with a continuous catgut suture, to prevent contamination of the wound with feces, the skin about the opening is divided by semicircular incisions and the gut carefully dissected from its attachments and brought well up through the incision. That portion of the bowel included in the spur is then excised, and a lateral or end-to-end anastomosis made by means of circular enterorrhaphy, the Murphy button, or any of the various devices used for this purpose.

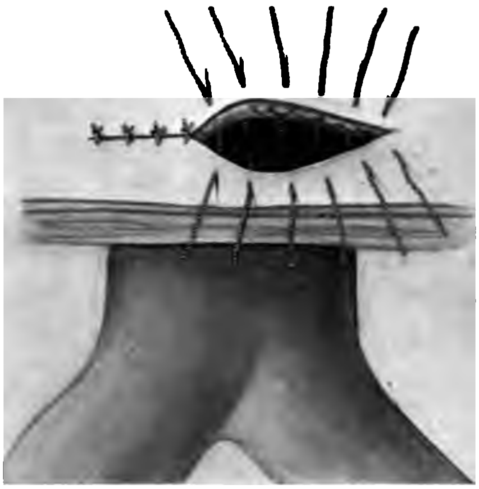

Fig. 172.—Second step in the author's clamp operation for the closure of an artificial anus.

Ligature Operation.—Another method suggested for dividing the spur is the silk ligature. This has not met with favor because the spur is simply divided without removing any tissue. The ligature is introduced through the spur as deeply as is safe by means of a needle; it is then tied and allowed to slough out. I would suggest that if a ligature be used at all it should be made of India rubber and adjusted, tightened, and secured by means of a perforated shot; this is preferable because silk is but slightly elastic and sometimes fails to cut its way out. The ligature having sloughed out, the operation is completed by closing the opening in the same manner as in my clamp operation.

Methods of Closing Fecal Fistula.—The manner of closing a fecal fistula depends largely upon the length of the sinus and size of the opening. When the gut simply adheres to the abdominal wall, or the sinus is short and the feces are discharged through a small opening, it can often be cured by keeping the patient in the recumbent position, regulating the diet so that the stools are solid or semisolid in consistence, and cauterizing the edges of the opening and the sinus with the Paquelin cautery, silver nitrate, or copper sulphate; in addition, a piece of gauze should be kept in the wound to act as a drain and to stimulate healing.

When the sinus is deep and tortuous, it should be carefully dissected out and the opening in the bowel closed by Czerny-Lembert sutures; the intestine is then dropped back into the abdominal cavity and the external wound is closed.

When the opening in the bowel is large after the sinus has been dissected out, it may be closed by excising a portion of the gut and making an end-to-end or lateral anastomosis, or by folding the edges of the opening together (*adossement*) and uniting them with sutures.

CHAPTER XXXV

INTESTINAL OPERATIONS (*Continued*)

INTESTINAL EXCLUSION

THIS procedure, though comparatively new, has become quite popular, largely through the writings of Trendelenburg (1880), Von Hacker (1888), and Salzer (1891–92). Intestinal exclusion consists in diverting or shutting off the fecal current from a small or considerable part of the intestine in order to afford relief from obstruction or to rest the diseased bowel and permit it to heal. When this operation was first suggested, its field of usefulness was very limited, but in the last few years it has been resorted to in the treatment of the following affections, viz.: Malignant and non-malignant tumors, strictures, extra-intestinal pressure, adhesions, angulations, flexures, chronic invagination, and foreign bodies which partially or completely occlude the bowel. It has also been employed in tubercular and other ulcerative lesions of the intestine causing chronic diarrhea, in fecal fistula opening upon the surface or into the vagina or bladder, and to avoid the formation of an artificial anus.

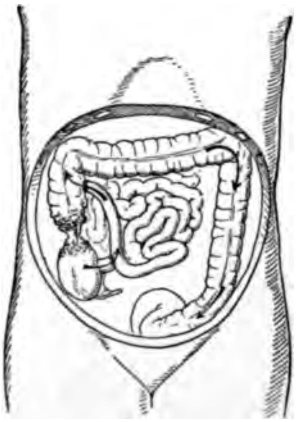

Fig. 173.—Intestinal exclusion for carcinoma of the cecum, showing ileocolostomy for relief of the obstruction and ileocecostomy for purposes of drainage (author's case).

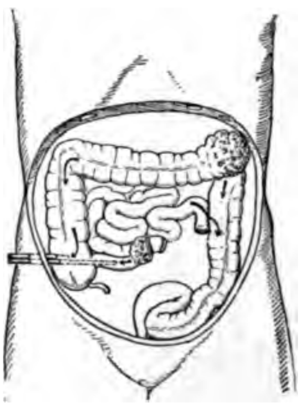

Fig. 174.—Intestinal exclusion for the relief of annular carcinoma of the hepatic flexure and also of the ileum (ileocolostomy). Drainage of the colon and cecal end of the ileum by means of the author's cecostomy ("Gant's Cecostomy," *N. Y. Med. Jour.*, Aug. 15, 1908).

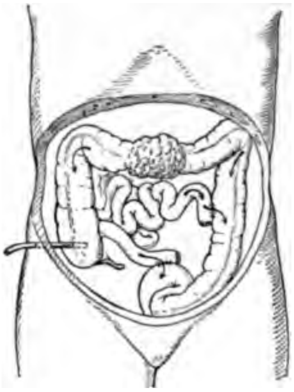

Fig. 175.—Intestinal exclusion for inoperable cancer of the transverse colon (ileosigmoidostomy) for relief of obstipation, ileorectostomy to drain the lower ileum, and cecostomy to drain the excluded bowel (author's case).

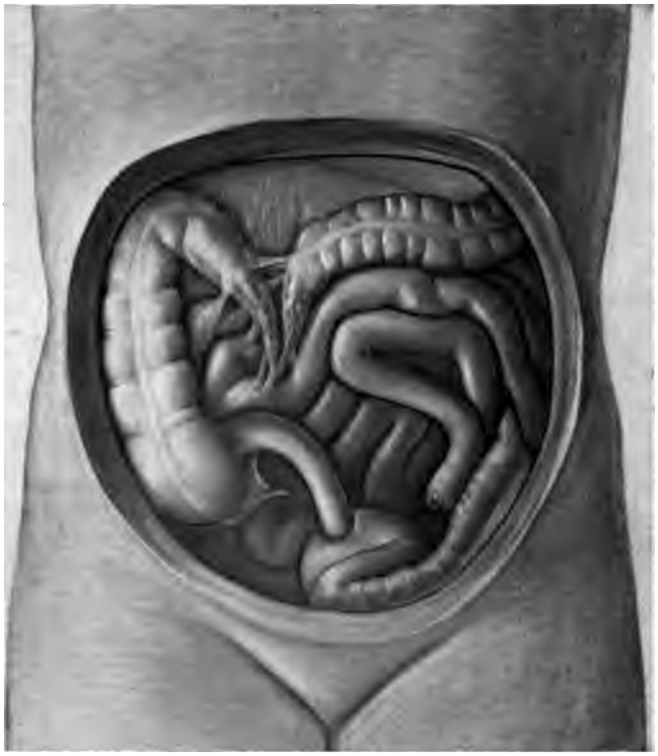

Fig. 176. Intestinal exclusion for colonic ptosis complicated by dilatation, angulation, and adhesions (ileosigmoidostomy). Drainage by ileoproctostomy (author's case).

I have resorted to intestinal exclusion on 16 different occasions for the relief of the following conditions: (*a*) Malignant obstruction—1 cecum (Fig. 173), 1 hepatic flexure (Fig. 174), 1 transverse colon (Fig. 175);

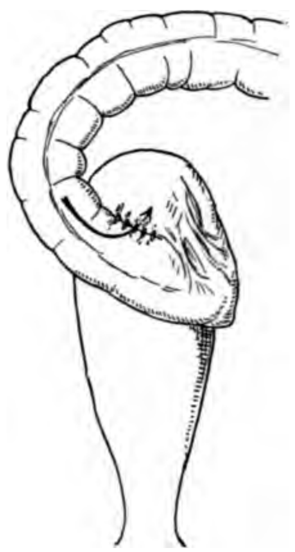

Fig. 177.—Intestinal exclusion for the relief of angulation at the rectosigmoidal juncture produced by adhesions (proctosigmoidostomy) (author's case).

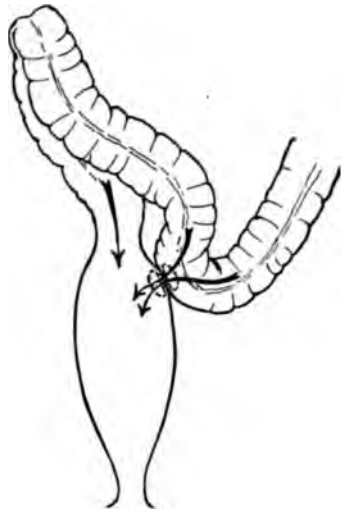

Fig. 178.—Intestinal exclusion for acute angulation of the sigmoid flexure (rectosigmoidostomy); lowermost arrow indicates the direction of the fecal current, and uppermost arrow shows drainage of the excluded loop (author's case).

(*b*) benign stricture (descending colon, Fig. 25); (*c*) multiple polyps (colon and sigmoid flexure, Fig. 174); (*d*) dilatation with ptosis and angulation of the colon (Fig. 176); (*e*) extensive adhesions (1 fibrous bands extending from the mesentery over the cecum and to the lateral abdominal parietes, Fig. 189), 1 sigmoid massed in the pelvis and adherent to the rectum (Fig. 177); (*f*) chronic ileocecal invagination, chronic volvulus of the sigmoid flexure due to adhesions; (*g*) acute angulation (1 splenic flexure, 1 sigmoid flexure, Fig. 178); (*h*) enteroptosis and angulation (1 of the transverse colon, splenic and hepatic flexures, Fig. 179); and 1 of the cecum, ascending colon, and hepatic flexure; (*i*) colica mucosa (spastic constipation); (*j*) ulcerative colitis causing chronic

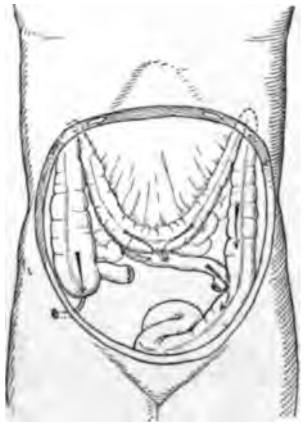

Fig. 179.—Intestinal exclusion for relief of M-shaped colonic ptosis with angulation of the splenic and hepatic flexures (ileosigmoidostomy). Cecum and ascending colon drained by appendicostomy and the transverse colon by ileocolostomy (author's case).

diarrhea; (*k*) extra-intestinal pressure caused by inoperable tumor of the uterus (Fig. 25).

There can be no question as to the advisability of this operation in cases of inoperable cancer of the intestine causing obstruction, and I believe that all patients who suffer from chronic constipation, recurring impaction, and the miseries of chronic intestinal auto-intoxication induced by mechanical obstruction should be given relief by this procedure when other less radical measures have failed. On several occasions I have witnessed marvelous results in this class of constipated subjects subsequent to the exclusion of a diseased segment of bowel. Lane (*Operative Treatment of Chronic Constipation*, 1904) reports success from the treatment by exclusion of constipation and autointoxication referable to adhesions (especially of the cecum and ascending colon) which interfered with the fecal current. Since the appearance of the above article he has reported other cases of obstinate constipation cured by resection of the colon and the joining of the ileum to the rectum. My experience with exclusion operations where the ileum is anastomosed to the lower sigmoid or rectum agrees with that of Lane and other writers on the subject, in so far as the bowel movements are concerned. All agree that the stools shortly following the operation are frequent and soft or fluid, but as time goes on the evacuations become less frequent and more solid. There is every reason to believe that the ileum becomes enlarged (this was directly observed by me in 1 case) and to a certain degree performs the function of the colon.

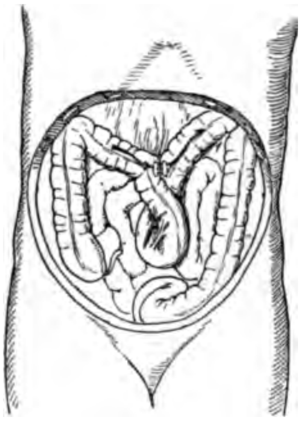

Fig. 180.—Intestinal exclusion. Simple entero-anastomosis (with Murphy button), performed for the relief of volvulus due to ptosis of the transverse colon (author's case).

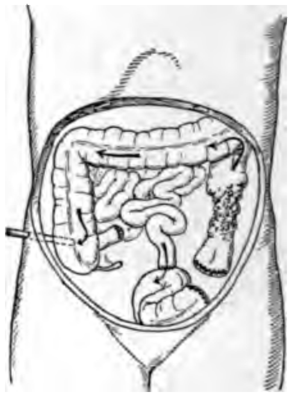

Fig. 181.—Unilateral intestinal exclusion (ileorectostomy) for the relief of inoperable carcinoma of the descending colon. Excluded segment of bowel drained by cecostomy (author's case).

Some operators hold the opinion that the functionating power of the bowel is destroyed when it does not act for a considerable time. This is not in accord with my experience. On no less than 6 occasions have I placed at rest sections of the colon and the rectum, for periods varying from one to five years, and then established the natural channel after the pathologic condition for which I operated had subsided. In each instance the once excluded part apparently fully performed its function and gave no visible or other evidence of atrophy.

Intestinal exclusion is designated as *partial* when the main fecal current is diverted in another direction, but some of the feces still find their way into the cut off segment of bowel, and *complete* when the contents of the intestine are entirely prevented from entering the excluded part of the gut. A segment of the intestine may be excluded (*a*) by **simple entero-anastomosis** with button or suture (Fig. 180); (*b*) by closing the bowel on one side of the lesion and anastomosing the proximal end with healthy bowel below, a procedure known as **unilateral exclusion** (Fig. 181); (*c*) by dividing the intestine on both sides of the diseased area and joining the proximal and distal ends, an operation which bears the name of **bilateral exclusion** (Fig. 182).

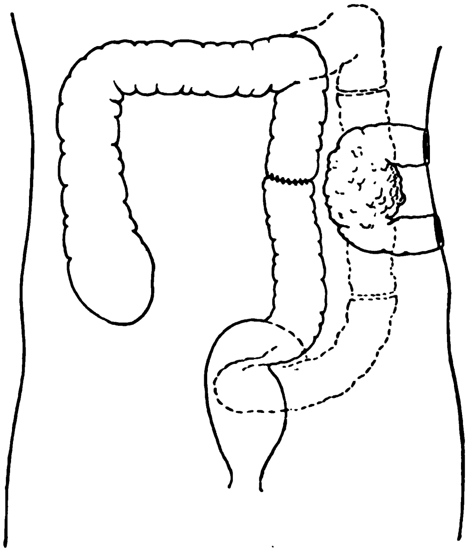

Fig. 182.—Bilateral intestinal exclusion for irremovable cancer. The ends of the diseased segment brought to the surface for drainage.

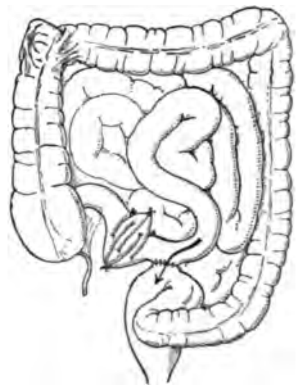

Fig. 183.—Intestinal exclusion (ileoproctostomy), showing the author's method of preventing regurgitation by the formation of acute angulations in the ileum. Operation performed for the relief of obstructive adhesions situated at the hepatic flexure.

Intestinal exclusion is rarely employed for the relief of disease situated in the [illegible] often practised for the alleviation and cure of the obstructive lesions so frequently encountered in the large bowel. Neither simple anastomosis nor unilateral exclusion are entirely satisfactory unless special provisions are made for drainage of the excluded segment, seeing that the feces are not absolutely prevented from entering the excluded piece of bowel. These procedures are serviceable, however, for drainage purposes in cases of annoying or dangerous obstruction, and in certain instances will help to relieve the patient until the obstruction can be definitely removed.

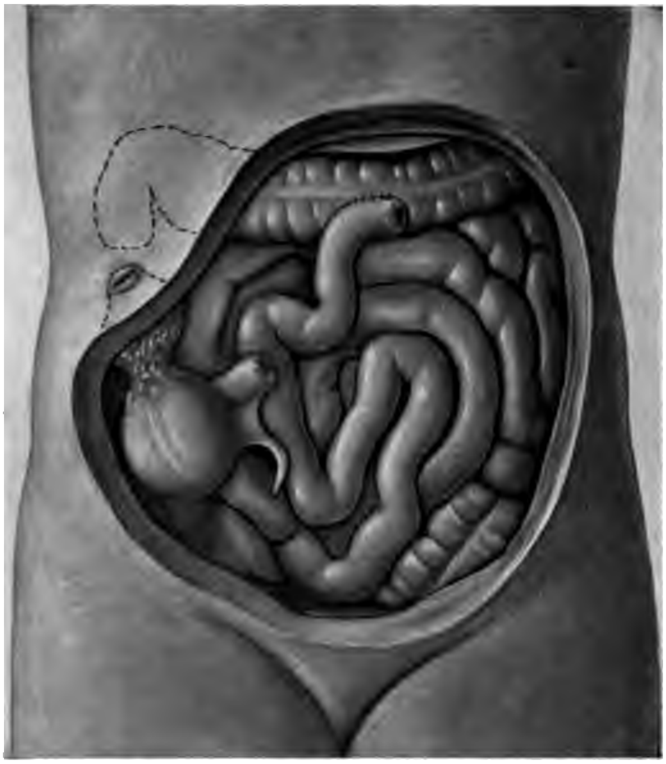

Fig. 184.—Unilateral exclusion for the relief of a stricture in the lower ascending colon. The ileum is seen divided, with both ends closed, the proximal being joined to the colon (ileocolostomy). The transverse colon has been divided, and one end closed and the other left open for drainage.

Attempts have been made to prevent regurgitation after these procedures by narrowing the intestine with a *ligature*. Personally, I have attained this object much more effectually by scarifying the bowel and forming a double acute angulation (Fig. 183) which blocked the feces. These types of exclusion are useful in the treatment of ulcerative lesions of the colon, but their results are not to be compared with those following appendicostomy or the author's cecostomy, with an arrangement for small intestinal irrigation through the ileocecal valve. In a few instances I have found unilateral anastomosis effective in establishing the regularity of the stools in patients suffering from constipation due to a mechanical obstruction (Fig. 184).

Bilateral exclusion is the operation of choice when the bowel is partially or completely occluded from without or within by a cancer, stricture, adhesion, angulation, twist, or other inoperable lesion, because it isolates the disease and permits the feces to pass unobstructed through the bowel. Surgeons who have never resorted to intestinal exclusion are unable to conceive an idea of the relief which it affords in properly selected cases of obstinate constipation arising from mechanical obstruction.

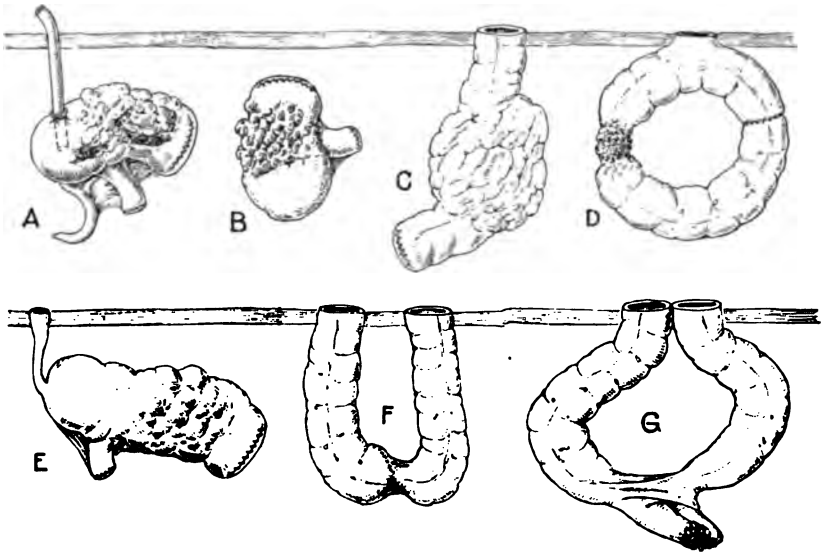

Fig. 185.—Showing the methods of disposing of and draining the diseased segment of bowel when it cannot be removed (see text).

In some of the earlier operations of exclusion, no attempt at drainage was made. Surgeons of experience with this procedure now agree that it is unwise to exclude a piece of gut without supplying a drain to provide against distention, fecal impaction, foul discharges, and their contained virulent bacteria. This rule applies equally to simple anastomosis or unilateral and bilateral exclusion.

Since most of the pathologic conditions for which this procedure is practised are located in the colon, drainage can be established by means of appendicostomy, cecostomy, or colostomy; or an outlet for the discharge may be made by anastomosing the closed or blind end of the ileum with the sigmoid or rectum, or after the manner shown in the accompanying illustration (Fig. 176).

There has been much difference of opinion as to which is the best method of dealing with the ends of the gut in bilateral exclusion when the diseased segment cannot be removed. Some one has advocated isolating the involved area by closing the gut on both sides (Fig. 185, B), but it is generally admitted that this is a most dangerous procedure, because no provision is made for the escape of the discharge, which in time will cause much suffering, if it does not rupture the bowel.

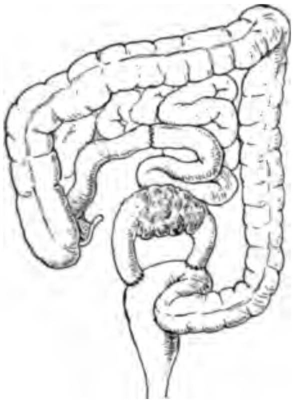

Fig. 186.—Bilateral intestinal exclusion for cancer of the ileum. The ends of the healthy bowel are seen anastomosed to each other, and the ends of the diseased segment to the sigmoid flexure (ileosigmoidostomy) to secure drainage.

The following methods of securing drainage in bilateral exclusion have been employed: By closing both ends of the gut and draining through the appendix (Fig. 185, E) or cecum (cecostomy) (Fig. 185, A), by bringing both ends to the surface through the same (Fig. 185, G) or separate incisions (Fig. 185, F), by joining one or both ends to some other part of the intestine (Figs. 176, 186), by anastomosing the ends on either side of the obstruction and uniting the gut to the skin where it is opened (Fig. 185, D), or by closing one end and bringing the other to the surface (Fig. 185, C). These provisions for drainage are employed for inoperable lesions of the bowel.

In cases of intestinal obstruction, where the patient is in a critical condition, it is wise to defer radical procedures until he is better able to stand the operation, but at the same time it is absolutely necessary to drain the bowel in order to save life. In such cases the involved piece of gut should be withdrawn and sutured to the skin after a lateral anastomosis has been made by suture or McGraw's rubber ligature (Fig. 187, A). Immediately, after a few hours or days, according to the exigencies of the case, instantaneous relief from the obstruction is given by excising the projecting loop and forming an artificial anus. When the patient has somewhat recovered his strength, the ends of the gut are freed, inverted, and closed by purse-string suture, leaving the feces to find their way through the anastomotic opening (Fig. 187, B) formed between the two legs of the loop.

In 1 case operated upon by me for obstruction due to a stricture, complicated by adhesions and extensive ulceration of the sigmoid flexure, the diseased bowel was anchored outside the left abdominal wall (Fig. 188, A) and immediately drained through a Paul tube; one week later it was excised and an artificial anus made (Fig. 188, B). As a result of rest, local irrigation, and topical applications the ulcers soon healed, and I established the continuity of the intestine by means of circular enterorrhaphy.

Technic of Intestinal Exclusion.—The patient is prepared as for other abdominal operations, and the incision is made directly over the lesion when its location is known, or through the left rectus, or at a point midway between the umbilicus and the pubes when it is not.

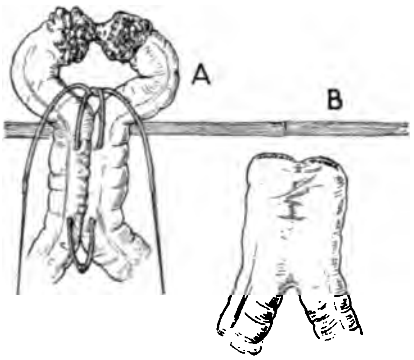

Fig. 187.—Bilateral intestinal exclusion for annular carcinoma: A, Anastomosis with McGraw's ligature and amputation of the growth; B, colostomy opening closed some weeks later (author's case).

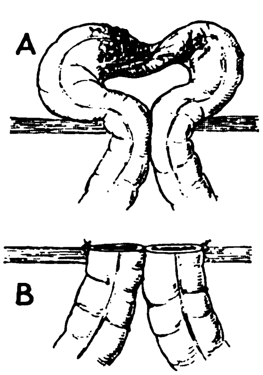

Fig. 188.—Intestinal exclusion for stricture, ulceration, and adhesions: A, Diseased bowel sutured outside the abdomen; B, appearance of colostomy openings after amputation of the gut (author's case).

The technic of anastomosis need not be discussed here because it has already been described. Since most of the lesions which cause mechanical obstruction are situated in the large bowel, it is customary to establish a fistulous communication between the ileum and the sigmoid flexure or rectum, but in 1 case which did well I made an anastomosis between the lower ileum and the ascending colon for the relief of cancer of the cecum complicated by adhesions, and then provided drainage by means of cecostomy (Fig. 189).

No attempt will be made to describe the many different ways of excluding a part of the bowel. I will, however, briefly give one example respectively of the operations of unilateral and bilateral exclusion.

Technic of Unilateral Exclusion.—The ileum is divided between rubber-covered clamps about 6 inches from the cecum, and when lateral anastomosis is to be made, both ends of the severed gut are inverted and closed by a purse-string suture. The proximal end of the ileum is then joined by a lateral or end-to-end anastomosis to the free border of the upper rectum (Fig. 176), the sigmoid flexure (Fig. 181), or other part of the colon (Fig. 184) below the diseased area, and the operation is concluded by draining the excluded segment of the bowel by means of cecostomy or appendicostomy, or by making an anastomosis between it and any segment which will give vent to the discharge. In this procedure the bowel is divided between two sets of clamps placed on either side of the growth to prevent leakage upon severance of the gut, and all four of the cut ends are closed by a whip- or purse-string suture, except when one end of the diseased segment is to be drained through the skin. Where both ends are closed, the excluded bowel should be drained by one of the methods already described (Fig. 185). The operation is then completed by uniting the healthy end above with the lower one by means of a lateral or end-to-end anastomosis, using either the suture, the Murphy button, or the McGraw ligature.

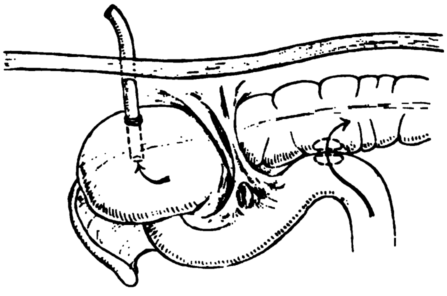

Fig. 189.—Intestinal exclusion for cecal cancer with adhesions (ileocolostomy) and drainage of the cecum (author's case).

CHAPTER XXXVI

TREATMENT OF CONGENITAL MALFORMATIONS OF THE BOWEL

General Remarks.—When the rectum, anus, or other part of the large intestine is completely occluded by a congenital deformity, immediate surgical intervention is imperative to prevent death from exhaustion toxemia, or rupture and peritonitis; but when the obstruction is only partial, so that the meconium can escape and the feces be evacuated by the aid of cathartics and enemata, radical procedures should be temporarily deferred because young infants stand extensive operations poorly.

A careful diagnosis should be made in each case before any operative procedures are decided upon. When the deformity is low down, its nature can be readily determined by inspection of the anus (bulging and discoloration of the skin) or by palpation; but when higher up a positive diagnosis is always difficult and sometimes impossible. Some authorities recommend the introduction of a trocar to locate the blind end of the gut, but this is a most dangerous practice and one which should be condemned.

The following are the most common types of congenital malformations concerning the rectum and anus: (*a*) Congenital narrowing of the anus; (*b*) closure of the orifice by membranous bands (Fig. 190); (*c*) imperforate anus, where the rectum ends in a blind pouch; (*d*) imperforate anus with fecal fistula opening into the vagina, bladder, urethra, uterus, or upon the surface of the body; (*e*) imperforate rectum with normal anus, and (*f*) obliteration of the rectum.

Congenital malformation of the lower bowel invariably causes obstipation and requires an operation before the child can have regular and easy evacuations. Many surgical procedures have been suggested for the correction of the different types, but lack of space prevents a full discussion of them all, hence I will briefly describe only those operations which have been found most generally useful.

Treatment of Congenital Narrowing of the Anus.—This complaint can be corrected by ***divulsing*** the anus daily with the finger, anal dilator, or bougie.

When the constriction is fibrous and involves the entire anal canal, stretching it as above indicated affords but temporary relief, and it is advisable to introduce a straight probe-pointed bistoury and incise and drain it (posterior proctotomy). The postoperative treatment consists in cleansing the wound and packing it with gauze, together with an occasional introduction of the finger or bougie to prevent too much narrowing in the course of healing. Strictures situated higher up, which prevent the escape of meconium and feces, cannot be directly operated upon with safety, but the patient may be given immediate relief by the establishment of an artificial anus above the obstruction.

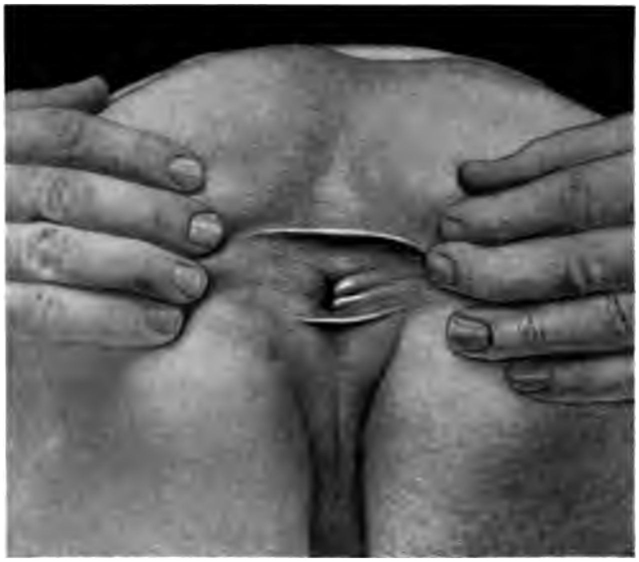

Fig. 190.—Congenital narrowing of the anus from fibrous bands which induced costiveness and painful defecation. This patient was completely relieved by first dividing and then trimming off the obstructive band.

Treatment of Membranous Closure of the Rectum or Anus.—When the anus is occluded by a fold of skin or connective tissue, this condition is easily corrected. Such bands or folds (Fig. 190) are seized and held with an artery forceps as they are trimmed off with scissors, while the finger is oiled and introduced into the bowel from time to time to avoid overcontraction. Bands and circular diaphragms, involving the rectum, but within reach, should be treated in the same manner or be broken up or divided with the finger, care being taken not to lacerate the thin membrane and bring about peritonitis. It is advisable temporarily to pack the rectum to arrest bleeding, and occasionally to pass the bougie for a few weeks following the operation.

When the membranous partitions are complete or nearly so, and are located high up in the rectum, the sigmoid, or the colon, colostomy should be performed to give vent to the fecal and other discharges.

Treatment of Imperforate Anus Where the Rectum Ends in a Blind Pouch.—When the *cul-de-sac* terminates near the surface, it is easier to correct than when the rectum ends an inch or more above the anus. Before beginning the operation the normal site of the anus should be located, and this can usually be done by the discovery of a depression in the skin.

The sphincter should be preserved if possible, but when this is not practicable, the new anus should be made in or near its usual site. Ordinarily, the dissection to reach the cul-de-sac is started by an incision extending between the coccyx and the normal location of the anus, which gives plenty of room in which to work.

The dissection should be carefully made with knife or scissors until the rectum is reached. The bowel is then freed from its attachments and drawn down and out of the wound, where it is opened and washed out. That portion of the wound lying between the coccyx and the posterior margin of the anus is then closed by a continuous catgut suture, after which the rectum is stitched to the skin edges of the wound, forming a new anus. When there is reason for fearing infection, one or two gauze drains may be placed along the sides of the bowel.

In order to avoid a possible peritonitis the operation should be completed, if possible, without incising the peritoneum, but when this becomes necessary, the peritoneal cavity should be closed and, if need be, drained.

When the blind pouch cannot be made to reach the surface, it should be brought downward as far as possible, surrounded with gauze pads, opened and irrigated by means of a free incision, or the trocar and canula, and then sutured as near to the anus as tension will permit. Usually a mucous fistula forms between the end of the bowel and the anus, through which the feces are discharged with a fair degree of comfort. The introduction of the finger from time to time will prevent the formation of a stricture.

I do not believe one is justified in removing or turning the sacrum aside in order to reach the cul-de-sac when very high up, because it would probably kill the infant; under such circumstances, I would prefer to resort to left inguinal colostomy, and at some later date, when the child is stronger, do the radical operation.

Treatment of Imperforate Anus with Fecal Fistula Opening Into the Vagina, Bladder, Urethra, Uterus, or Upon the Surface

of the Body.—In this class of cases the fistulous tract opens most frequently into the vagina or at the vulva, and is comparatively easy to eliminate after the bowel has been freed and sutured at the anal site, but when the fecal outlet is at other points the deformity is very much more difficult to correct.

When the opening is located in the vagina and is of sufficient size to permit the feces to escape with reasonable comfort and regularity, a radical operation should be deferred for a few years; in the meantime, the caliber of the opening may be increased by instrumentation, introduction of the finger, or incision. On the contrary, when the opening is small and causes retention of the meconium and feces, an immediate operation is necessary. When the infant is in a dangerous condition from this source, a guide or groove director should be passed downward and backward through the vaginal or vulvar outlet, and made to cause a bulging of the skin at the anal site, all tissues in front of it being divided to relieve distention and make a vent for the excrement. In case the opening is very small and the cul-de-sac is near the surface, the latter should be dissected loose, brought down and stitched to the skin at the anus, after which the vaginal opening may be closed by cauterization or by freshening the edges and uniting them with interrupted catgut sutures.

I have seen 2 cases where the vaginal opening was surrounded by the sphincter; in such instances I have succeeded in reaching the cul-de-sac from below, and have then freed the muscle by elliptic incisions, transplanted it into its normal location, and then closed the wound with strong interrupted sutures of chromicized catgut.

In case the opening is large and there is sphincteric control, the question as to whether to operate or not should be left for the parents to decide.

In deplorable cases of imperforate anus, where the feces escape into the bladder or urethra, it is extremely difficult to obtain satisfactory results. If feasible, Amusat's plan of dissecting the blind end of the rectum free, bringing it down, opening and suturing it to the perineal region, should be practised when possible, and the fistulous opening allowed to close spontaneously. When this cannot be accomplished, left inguinal colostomy should be resorted to at once to avoid death from infection, exhaustion, or intestinal obstruction, after which the feces should be washed out of the bladder. At a later date, when the child is older and stronger, the abdomen should be opened, the rectum and bladder separated, and the openings in each closed by continuous silk or linen sutures, after their edges have been freshened and the bowel has been freed, carried down, and a new anus established at the usual site. Congenital recto-urethral fistulæ are not so difficult to cure as the rectovesical, because the cul-de-sac is near the surface and the opening is usually in the perineum, which makes it easy to reach and deal with the cul-de-sac and to freshen and close the urethral outlet by suture, or permit it to heal of its own accord by granulation, as after external urethrotomy.

In delicate infants it is at times advisable to enlarge the opening by divulsion or incision to enable the feces to escape until the child is stronger and can withstand a radical operation. It occasionally happens that the cul-de-sac is situated so high up that it cannot be reached and brought down; under such circumstances a permanent artificial anus is indicated.

In imperforate anus, where the fistula opens upon the surface, as, for instance, in the perineum, sacral region, prepuce, the course of treatment to pursue depends upon the size and location of the opening. When it is large and the movements are fairly satisfactory, immediate operation is contra-indicated, but when it is small it should be enlarged or a vent for the meconium and fecal discharge should be made in the left iliac region. At some future time the rectum should be reached, drawn down, and sutured to the skin at the anus, and, when feasible, the sinus should be incised, drained, and allowed to heal by granulation; but when this is impracticable, it should be dissected out and the edges of the wound united by catgut stitches.

When the fistulous tract is long and finds an outlet in the prepuce, scrotum, or glans penis, Tuttle suggests (without having tried it) that the sinus be divided adjacent to the cul-de-sac and the proximal end ligated and inverted into the rectum, and the distal end cleansed, closed by ligature, and left to atrophy.

In this class of cases the opening is small and does not permit the intestinal contents to escape, and when an anal outlet cannot be established, no time should be lost in performing colostomy.

Treatment of Imperforate Rectum Where the Anus is Normal in Location and Appearance.—A mistaken diagnosis is very frequently made in this class of cases, and obstruction from a congenital deformity is not suspected, because the anus on examination appears natural in every way.

When the cul-de-sac is near the anus it may be quickly and safely drained by means of a trocar and canula or, preferably, by a free incision. At a later date the anal canal below it may be denuded and the mucosa of the rectal pouch brought down and united to the skin at the anus.

Treatment of Obliteration of the Rectum.—Now and then partial or complete obliteration of the rectum and a part of the colon takes place, and when it does, it is extremely difficult to correct.

In favorable cases, where the blind end of the gut can be safely reached, brought down, and sutured in the perineal region, this is the best plan; but when there is any doubt as to the lowermost location of the gut, an exploratory incision should be made, and the nature of the operation determined upon after the intestine has been carefully examined. In the majority of cases, owing to the amount of gut obliterated, it will be found advisable to bring the most available piece of colon to the surface and form a permanent artificial anus. Usually, because of great distention, it is advisable to open the gut and permit the meconium and gas to escape at once. *Colostomy* should not be resorted to for the relief of congenital deformity of the rectum or anus except when the operator is unable, by means of proctoplasty, to free the bowel and locate the anus in its normal position, and when it is imperative to relieve the obstruction forthwith to save life.

Congenital Deformity and Displacement.—Now and then patients are encountered who have suffered since birth from a congenitally deformed or misplaced bowel. Obstipation under such circumstances may be induced by narrowing, angulation, or twisting of the gut, or because of pressure upon the bowel when it lies in an unnatural position.

CHAPTER XXXVII

TREATMENT OF EXTERNAL INTESTINAL PRESSURE AND STRICTURE

TREATMENT OF EXTERNAL INTESTINAL PRESSURE

THE many different ways by which obstipation may be induced by pressure upon the bowel from without have already been mentioned and described in the chapter on the Etiology of Mechanical Obstipation. Occasionally this type of costiveness can be corrected by certain bodily exercises or by changing the patient from one position to another, but when these milder measures fail to accomplish the desired result, and topical applications and other treatment designed to reduce the inflammation in, or diminish the size of, the offending organ or tumor prove equally powerless, surgical intervention is rendered imperative. In this class of cases the trouble is most frequently due to an enlarged prostate which requires operation, a retroflexed uterus which needs replacement, a tumor which requires excision, adhesions which should be divided, or to ptotic viscera which ought to be replaced and fixed in their normal position.

TREATMENT OF INTESTINAL STRICTURE

A tight stricture located at any point in the small or large intestine may induce an *acute* obstruction. Stricture of the small intestine is uncommon and, when present, rarely produces constipation; while, on the other hand, stenosis of the colon or rectum is of frequent occurrence and at one time or another invariably causes obstipation.

The treatment of intestinal stenosis may be non-operative or surgical.

Non-operative Treatment.—A great deal can be accomplished by palliative measures—relieving pain and keeping the bowel open—toward improving the general condition and prolonging life; but non-surgical procedures rarely effect a permanent cure.

When the condition is intractable or the patient refuses to submit to an operation, the plan of treatment to pursue depends upon the location of the stricture, the degree of obstruction produced by it, and the actual conditions present in regard to health and strength. Naturally, a stenosis situated in the sigmoid or rectum can be reached and treated more satisfactorily than one situated higher up in the colon or the small bowel, when impaction exists and treatment by instrumentation is impossible.

The principal features in the non-operative treatment of ***high*** stricture consist in securing daily soft evacuations and preventing or relieving the pain induced by collections of gas and enterospasm.

Regulation of the Stools.—It is exceedingly difficult in this class of cases to regulate the movements, prevent straining, and keep the feces from collecting above the constriction. The consistence and frequency of the evacuations are controlled mainly by regulating the diet, administering laxatives and cathartics, and employing high or low enemata to soften and bring away fecal accumulations.

Patients suffering from intestinal stricture should be advised to eat more frequently and to consume a smaller amount of food at each meal.

When the constriction is complete or nearly so, all solids should be prohibited and but a slight amount of fluid nourishment should be allowed until the stenosis has been excised or the obstruction relieved by cathartics and enemata. Where the patient is greatly weakened from lack of food, nutrient enemata should be administered as often as required.

Patients suffering from chronic stenosis, when there is only a moderate degree of obstruction, may be permitted to consume a reasonable amount of solid nourishment, taken in small quantities at frequent intervals, but should partake only of foods which leave a small residue, and chew everything thoroughly, especially potatoes and meat. Usually they may be allowed to have soups, artificial foods, cereals, oysters, chopped meat, soft-boiled eggs, mashed potatoes, and milk in liberal amounts, and as much water as they can be induced to drink. The diet may be changed occasionally during attacks of indigestion and to prevent suffering from gas distention.

When satisfactory evacuations cannot be obtained by dieting and water drinking, a mild laxative should be administered daily to soften the feces and enable them to pass the stricture, thus avoiding a fecal impaction.

Violent cathartics and purgatives are contra-indicated because they induce nausea, vomiting, and considerable pain, an undesirable number of evacuations accompanied by great straining, and, further, because the violent peristalsis they excite has been known to rupture the bowel when ulcerated.

Sometimes a saline or bitter water taken in small amounts just before breakfast or upon retiring will secure free and easy evacuations; at others, the same results may be obtained from the administration of 1 to 2 ounces of olive or mineral oil; but when these remedies fail to secure the coveted evacuations, a dinner pill (see Formulary) should be tried, and if it proves ineffective, castor oil, cascara sagrada, or compound licorice powder should be administered in amounts sufficient to soften and drive the feces through the stricture.

While it is necessary to keep the bowel moving regularly and avoid the evil consequences which would arise from fecal retention, it is undesirable to prescribe drugs which exhaust the patient through causing very frequent stools.

When there is a tendency toward recurring impaction, much can be done to prevent it and to bring away feces which have already collected by the intelligent employment of low and high enemata of warm water, soap-suds, oil, or glycerin. When the accumulations are small in amount and comparatively soft, one or two injections may suffice to dislodge and wash them out; but when the masses are numerous and large or hard, frequent copious injections extending over a period of two or three days or longer may be necessary to clear the intestine.

Impactions located in the upper rectum and sigmoid flexure can sometimes be reached and broken up through the proctoscope and sigmoidoscope, and readily brought away by irrigation. However, as a general rule, one must depend upon the colon-tube or a small catheter in order to get by the stricture and carry the solution into the upper bowel; but the short hard-rubber pipe can be relied upon when the constriction is in the rectum. In rare instances I have found it necessary first to divulse the stricture to enable me to introduce the soft colon- or other irrigating tube, but this is a dangerous procedure when the bowel is ulcerated and the stenosis is above the peritoneal attachment.

All forms of intestinal stenosis are accompanied by colicky pains and discomfort from gas collections. Occasionally patients can be made more comfortable by changing the diet and prescribing bismuth, chalk, charcoal, salol, beta-naphtol, and other remedies of this class to minimize the discomfort and the formation of gases. These remedies rarely afford complete relief, because the accumulation of gas is due to the blocking of the bowel by the stricture more than it is to increased fermentation. A great deal can be done to alleviate or remove colicky pains by friction, massage, galvanism, hot-water drinking, warm oil enemata, and the application of hot fomentations which soothe the bowel and allay irritation and enterospasm; but when they do not and the patient becomes exhausted, belladonna and opium should be administered hypodermically or in the form of a suppository to relieve the pain and arrest muscular spasms. Attacks of enterospasm can often be prevented by the occasional administration of a small dose of belladonna.

When fecal impaction is responsible for the gas distention, the pain will not cease until the impacted mass and scybala have been dislodged and evacuated by laxatives or enemata.

Some authorities recommend electricity and massage in the treatment of stricture, but I have found these of little value in the curative treatment of this complaint, though I have known them, on many occasions, to give temporary relief.

The non-operative treatment may be tried as long as it keeps the patient comfortable, but when it is seen that suffering is increasing and that intestinal obstruction is bound to occur in a short time, an operation is rendered imperative.

Surgical Treatment of Strictures Located Above the Rectum.—The surgical treatment of stenoses located in the small bowel and colon is very much alike, but when strictures lie below the sigmoid, the methods of dealing with them are quite different; because of this, I shall separately discuss the operations devised for their relief and cure.

The vast majority of stenoses situated above the rectum which produce constipation are located in the cecum, transverse colon, sigmoid flexure, or at the hepatic or splenic flexures. Consequently, I shall discuss more fully the operations which are most useful in the treatment of stricture in these localities, namely: *Colostomy, resection, exclusion,* and *coloplasty.*

The operation of choice in this class of cases depends principally upon the condition of the patient when seen, the nature of the obstruction, and whether or not he will consent to the operation best suited to his particular needs.

When distention is marked or the patient is exhausted from long suffering and loss of sleep, or from the ravages of an extensive ulceration and its consequent discharge, it is often advisable to open the bowel and give immediate vent to the contained gas and feces. If, under such circumstances, a radical operation is contemplated as soon as the patient is strong enough, the intestine may be scarified quickly, stitched to the skin, and then opened; but when intestinal exclusion is impracticable and the diseased segment of the bowel cannot be removed, a permanent *artificial anus* (*colostomy*) should be made by drawing a loop of the colon outside the wound and anchoring it to the skin after a spur has been formed to prevent the feces from again entering the rectum, the gut being amputated a few days later.

Formerly patients had little control over the movements following colostomy, but when an artificial anus is made according to the plan described elsewhere (Figs. 162, 163), there is little, if any, trouble from this source. To obtain the best results the anus should be established well above the seat of the disease. Except when it is unavoidable, the cecum and the small intestine should not be used for this purpose because of the frequent and fluid evacuations which will follow when the opening is made high up, causing the patient serious annoyance.

Resection is the ideal operation in all forms of stricture because it offers the patient a fair chance for a permanent cure. This operation involves some danger, but the mortality following it is not nearly so high at present as a few years ago, because of the great advances recently made in the technic of intestinal surgery. When vitality is low and the gut is greatly distended, it is best to drain the bowel by the aid of one of the procedures already mentioned and to remove the diseased segment of gut later; but when the condition of the patient is good and the intestine is but moderately distended, immediate resection is indicated.

After the stricture has been removed between a double set of clamps, the divided ends of the bowel may be joined by *end-to-end*, *lateral*, or *end-to-side* anastomosis with the *sutures alone* method, or by the aid of the *Murphy button* or other mechanical device.

End-to-end anastomosis is preferable, except when time is an object, the ends of the gut are of unequal size, or the bowel on either side of the stricture is diseased and unfit for circular enterorrhaphy. Under such circumstances lateral anastomosis is preferable.

End-to-side (lateral implantation) anastomosis should never be employed unless the ends to be united are of unequal size. The sutures alone method has almost completely taken the place of mechanical aids in this class of work, and the linen thread (Pagenstecher's) is fast superseding others as a suture material.

The technic of the most reliable methods employed in intestinal anastomosis has already been discussed and need not be repeated.

Exclusion of the obstructed part of the intestine according to the plans already outlined (see Intestinal Exclusion) is a most useful procedure, both for the purpose of providing drainage and affording immediate relief in acute obstruction, and also for giving permanent relief in chronic obstruction, when for any reason resection of the stricture is deemed inadvisable.

This operation consists in establishing a fistulous communication between a segment of intestine above the stenosis with that below it, so that the fecal current will have an uninterrupted passage. Most frequently the ileum is divided near the cecum and joined to the sigmoid flexure or rectum by lateral anastomosis after the divided ends have been inverted and closed with purse-string sutures (Figs. 154–157). Following this operation the movements are frequent and fluid for a few days, and then gradually become less frequent and more solid, until they are normal in number, quantity, and consistency.

Intestinal exclusion is destined to become a popular procedure as soon as its indications and technic are more generally understood. Some idea of the different methods of performing exclusion may be had by a reference to the preceding text and illustrations which fully explain them.

Coloplasty is quite as dangerous as resection, and the results do not compare with it. Here the stricture is located and the bowel is incised longitudinally, after which the upper and lower ends of the gut are shoved toward each other until the cut runs transversely to the bowel, when it is sutured. Coloplasty, when successful, increases the lumen of the bowel at the strictured point.

ILLUSTRATIVE CASE

Excision of the Transverse Colon, Sigmoid, and Rectum for Multiple Stricture and Ulcerative Coloproctitis.—The patient, Mr. F. C. C., aged forty-seven years, temperate and of regular habits, came to me for relief of bowel trouble of several years' standing. Examination determined that he was suffering from stricture and ulceration, the result of a chronic, ulcerative, hypertrophic coloproctitis; and also from excoriations of the skin caused by the frequent discharge of feces and of pus through two artificial ani, one in the left and the other in the right inguinal regions. There were no indications of tuberculosis. The patient never had had syphilis and the following are the principal points in the history of this most remarkable case:

In 1888 he was attacked with diarrhea which was accompanied by a frequent discharge of bloody mucus, for which he was ineffectually treated. A few months later a diagnosis of stricture was made and the constriction was dilated under general anesthesia, after which bougies were used. Only temporary benefit was derived and he went to his home in Cedar Rapids, Iowa, where he underwent a course of treatment by electricity in hopes that the stricture would be absorbed; this also proved a failure. He next went to Chicago and entered St. Luke's Hospital, where the stricture was again divulsed and the ulcerated areas curetted and cauterized by Dr. Owens. He was not benefited by the treatment, and entered Dr. Pratt's sanitarium where something was done, he knew not what, and his life was despaired of for several weeks.

In 1892 he entered the Post-Graduate Hospital, where Dr. Chas. B. Kelsey performed left inguinal colostomy, no decision being arrived at as to the exact nature of the stricture, the patient denying ever having had syphilis. The artificial anus failed either to heal the ulceration or to arrest the discharge, which caused so much suffering and irritation for several years that the patient determined to submit to another operation.

In 1898 he entered a hospital in St. Louis, where Dr. Bernays excised the rectum, which was strictured and extensively ulcerated. After this operation the patient continued to work until 1902, when he began having diarrhea and the constant discharge of fecal matter. These symptoms were caused by the almost complete closure of the artificial anus and by a new stricture which had formed in the upper sigmoid.

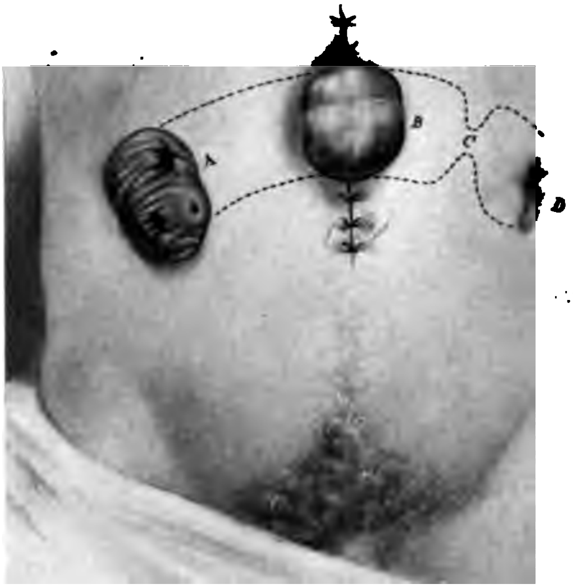

Fig. 101.—A. Prolapsed cecum, showing openings of ileocecal valve, appendix, and continuation of the colon; D, artificial anus.

He returned to New York, entered Miss Alston's sanitarium, and was again operated upon by Dr. Kelsey, who exposed the bowel by an incision in the left side. Upon examination it was found so diseased that it was returned to the cavity and the wound closed.

The abdomen was then opened on the right side and an artificial anus made in the cecum in hopes that the bowel below it could be healed and this opening closed at a later date. It was also expected that the strictured opening on the left side would close, but the patient was disappointed in both respects. The skin about both openings was kept constantly irritated as a result of the discharge of feces through the opening on the left (see Fig. 191, D), and [illegible] through that on the right side. This was not the only annoyance, as the liquid and mushy feces constantly extruded through the opening. A further discomfort was caused by protrusion of the cecum when the patient was in a standing posture, and in bed, if he coughed or sneezed. At such times the openings of the ileocecal valve, the appendix, and the interior of the colon were plainly visible, as will be observed in the accompanying illustration (Fig. 191, A). It was almost impossible to keep the dressings from being constantly soiled. Between keeping the [illegible] clean and irrigating and attending to the unclosed opening on the left side, his life was rendered almost unbearable.

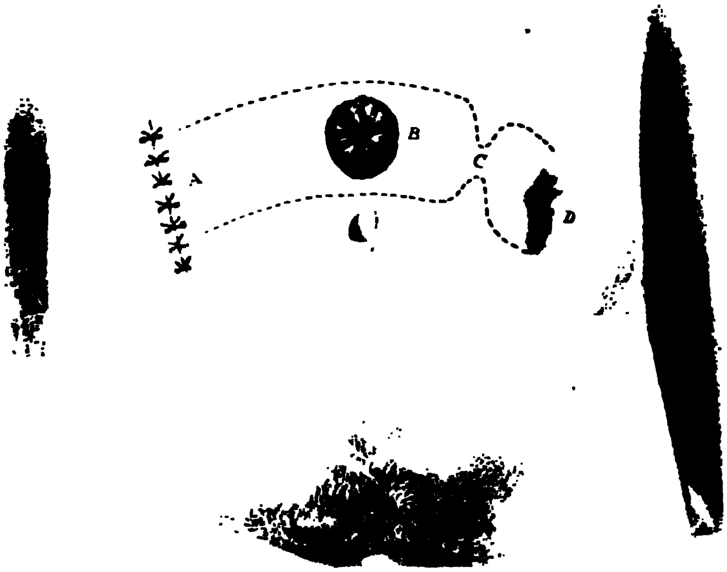

Fig. [illegible].—A, [illegible]. B, gut ready to be opened to form a new anus in the transverse colon. C, [illegible]. D, left inguinal colostomy.

This was the patient's plight when he called at my office, October 8, 1905, and begged me to try to relieve him, no matter how many or dangerous operations might be required, as he would rather die than live in his present condition.

My first step in the treatment was to bring up the transverse colon and make an artificial anus in the median line (Figs. 191, 192, B), hoping later to close the openings in the sides (Fig. 192, A and D). There was great difficulty in bringing the colon out and attaching it. Because of this tension there was retraction of the bowel, and when the wound healed an inadequate sized opening resulted, necessitating another operation.

A few weeks later he was again anesthetized and, with the aid of my assistants, B. E. Dolphin, L. G. Price, and J. A. McVeigh, a series of operations was performed wherein the diseased sigmoid and half of the transverse colon were excised (Fig. 192, A to D), a new artificial anus was established in the median line (Fig. 193), and the openings in both right and left sides were closed (Fig. 192, A and D).

Operations.—For one week previous the patient was kept upon a fluid diet and the last day before the operation he was given ¼ grain of morphin every eight hours in order to keep the bowels in a quiescent state, the patient in other ways being prepared as for any other laparotomy. The openings in the median line and on the left side were then cauterized with carbolic acid and quickly closed by continuous catgut sutures.

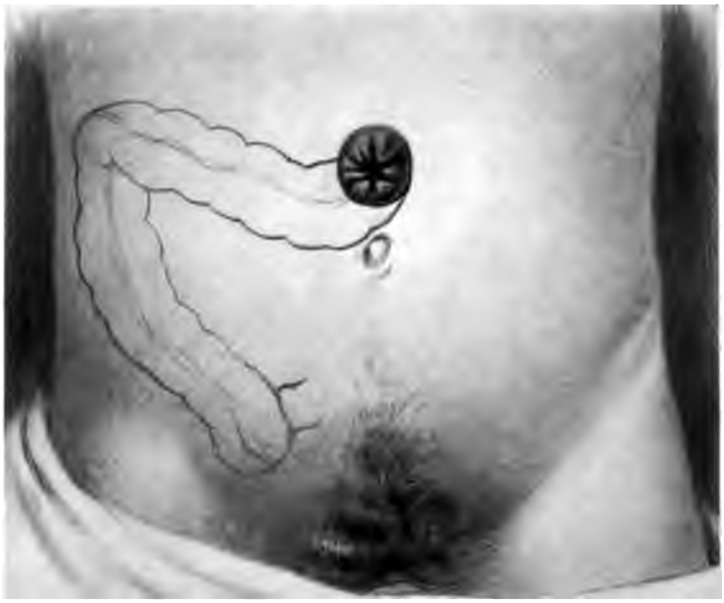

Fig. 193.—Showing position of the artificial anus and of the remaining portion of the colon, after the patient had fully recovered.

The edges of the opening on the right side were then freshened and it was closed without opening the peritoneal cavity. No. 1 chromic gut was used to approximate the fascia and muscles and plain catgut for the skin.

By means of free elliptic incisions about the opening in the left side, extending through the skin, muscles, and other abdominal wall structures, the gut was freed and it was observed that there was no loop, the end of the bowel forming the artificial anus, showing that the lower part of the sigmoid between it and the excised rectum had been removed at the time the opening was formed. The artificial anus and attached gut were lifted out of the abdomen and the mesentery detached along the bowel as far as was possible through this opening; the freed part of the gut was then wrapped with gauze and given to an assistant to hold. The anus in the median line was now dissected out and the transverse colon exposed by means of lengthy elliptic incisions.

The bowel was lifted upward and the mesentery remaining to be divided was ligated in successive stages. The mesentery and fat were about 2 inches thick along the sigmoid and transverse colon, which caused much delay in the operation, because of the difficulty and time required in applying the ligatures. The portion of the bowel held by the assistant was dropped into the abdomen through the first incision and was then withdrawn through the opening in the median line. The left half of the transverse colon and the remaining portion of the sigmoid, constituting in all 12 to 15 inches of gut, were then amputated and the distal end of the colon was sutured in the upper part of the incision to form a new anus (Fig. 193), a ligature being left upon the projecting end of gut to temporarily prevent the escape of feces. The peritoneum was sutured with catgut, but owing to the great amount of tension, strong silk sutures were used to approximate the other structures constituting the abdominal wall. The opening in the left side was closed in the same manner. The entire abdomen was then cleansed and covered with gutta-percha tissue, over which were applied the dressings. Sufficient morphin was ordered to keep the bowels from moving for several days. The ligatured end of the bowel projecting beyond the skin was amputated under local anesthesia on the third day. The patient made an uneventful recovery, except that the wound on the right side partially broke down at the end of a week, but later healed under application of caustics and the galvanocautery.

From the end of the third week until the discharge of the patient, at the end of the fifth, the bowels moved freely through the new opening. The stools were more solid, much less frequent, and caused much less annoyance than formerly, when the digestive fluids were being almost constantly discharged through the cecal opening. I have never performed a capital operation the results of which proved more gratifying to both the patient and myself than the one I have just outlined.

PATHOLOGIC REPORT (*Practitioner's Laboratory*).—*Sigmoid Flexure and Part of Transverse Colon.*—The lumen of the bowel is much contracted and cut open longitudinally, as though part of the specimen were wanting or cut away. The upper end shows an occlusion surrounded by a tumor-like mass. Inspection of the mucosa shows a rough jagged surface with two perforations, one of which is pathologic and about 1 cm. in diameter. The other is due to a knife cut. The wall is irregularly thickened and in part converted into masses of fairly firm tumor-like thickenings covered with numerous enlarged fatty appendices epiploicæ.

Microscopically.—There is no mucosa for the greater portion of extent, although near the artificial anus, and in patches elsewhere, there are vestiges of degenerated crypts of Lieberkuehn in all stages of atrophy. Surrounding this are areas of round-cell infiltration extending into the submucosa. Those of the lymph-follicles which remain are so merged into the areas of round-cell infiltration that they are indistinguishable as such. The ulcerative process has involved the greater portion of the submucosa also, which is eroded in places so as to expose the muscularis which forms the lining of the lumen. Areas of round-cell infiltration are also scattered throughout the muscular coat, which presents an irregular hypertrophy, many degenerated fibers, and in parts inflammatory foci. The section taken from the margin of the perforation shows simply the changes described above, but intensified, and including the serosa. The muscularis is surrounded by a layer of adipose tissue which varies up to 2 cm. in thickness. This also shows chronic cell infiltration and increase of fibrous tissue. There is scarcely a vestige of normal tissue, there being throughout a great increase of fibrous tissue, induration, or ulcerated foci of more recent date.

The most striking characteristic feature, however, is the enormous proliferation of the intima of the blood-vessels. The intimal hyperplasia in some instances amounts to obliteration of the lumen of the vessel. Accompanying this is an hypertrophy of the media and especially of the muscularis, though relatively to a lesser extent. Surrounding these vessels are round-cell infiltrations. This histologic picture, as a whole, presents that of an endarteritis syphilitica.

In conclusion, examination of the parts of tumor-like swellings shows that they are composed of fatty tissue.

Diagnosis.—Chronic ulcerative and obliterative coloproctitis.

Surgical Treatment of Rectal Stricture.—The following are the operative procedures which may be resorted to in the treatment of stenosis of the rectum and anus: (*a*) Divulsion; (*b*) internal proctotomy; (*c*) posterior (external) proctotomy; (*d*) proctoplasty; (*e*) Bacon's operation; (*f*) colostomy; (*g*) resection, and (*h*) excision.

Divulsion is frequently practised for the relief and cure of stricture situated within the lower 3 inches of the bowel, but is rarely employed when the stenosis is located above the peritoneal attachment (Fig. 194) because of the danger of peritonitis which would follow a rupture. Some operators prefer gradual and others forcible divulsion.

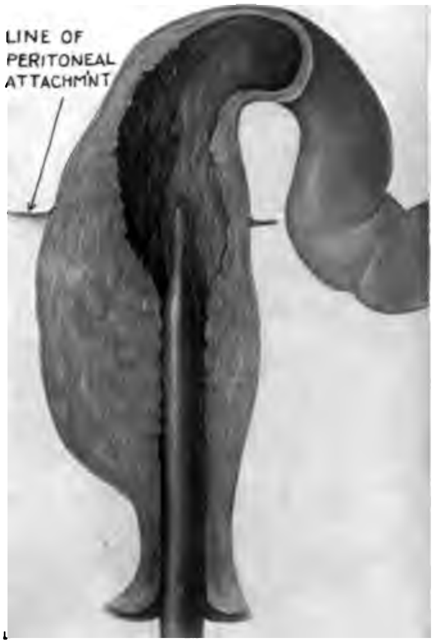

Fig. 194.—Showing rectal stricture with ulceration above, and the distance to which it is safe to pass a Wales or other bougie.

Gradual divulsion has a wider field of usefulness than forcible dilatation, because when carefully done it can be used in the treatment of strictures located in any part of the rectum or at the anus. Gradual divulsion may be accomplished with anal dilators (Figs. 228, 229), with the Hirschmann dilator (Fig. 224), or with the author's modification of the Barnes' bag (Figs. 222, 223), when the stricture is situated in the upper rectum at O'Beirne's sphincter or in the lower portion of the sigmoid flexure. Dilators and bougies (Fig. 195) should be introduced from two to three times weekly and permitted to remain from one to several minutes, depending upon the exigencies of the case. The instrument should pass the stenosis with comparative ease, otherwise injury or rupture of the bowel may follow the introduction of a large-sized bougie. Several deaths have been caused in this way. When the stricture is above the reach of the finger, the proctoscope or sigmoidoscope should be introduced and its location and character noted before the dilating instrument is passed, and extreme caution should be used during the insertion when there is extensive ulceration at or near the point of constriction.

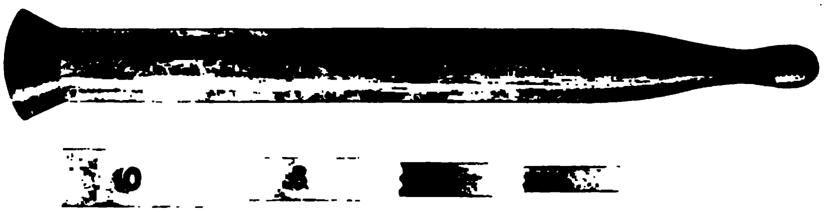

Fig. 195.—Wales' bougies. Numbers indicate different sizes.

Rapid or *forcible divulsion* requires a general anesthetic and may be accomplished with the fingers, large-sized bougies, or operating speculum, or one of the mechanical rectal dilators. This procedure in the treatment of strictures below the peritoneal attachment has little to recommend it, and should be utterly condemned in the handling of stenosis higher up. I know of 3 deaths from peritonitis which have followed forcible stretching and tearing of the bowel. This procedure is undesirable for the reason that it is extremely dangerous and that the relief afforded by it is of short duration.

Internal proctotomy is preferable to the procedure just described, but is more dangerous than external proctotomy, because it does not provide for sufficient drainage. This operation consists in passing a straight probe-pointed bistoury through the constriction and incising it in two or three places to increase the caliber of the bowel, following which the wounds are packed with gauze to arrest bleeding. After the operation the rectum should be irrigated at least once daily, and gauze drains be inserted to take up the discharge, with occasional introduction of a bougie to prevent too much contraction in the course of healing.

Posterior (external) proctotomy is the operation of choice in the treatment of strictures situated in the lower 3 inches of the rectum because it can be quickly done, is the least dangerous, gives the most room, and can be performed under either local or general anesthesia.

The technic of this procedure is simple and consists in guiding a long-handled, straight, probe-pointed bistoury with the index-finger up to and through the strictured part of the bowel, when the knife is turned toward the sacrum and withdrawn, splitting the rectum and dividing the sphincter and other structures as far backward as the tip of the coccyx, making a deep, triangular wound. Bleeding, which is always profuse, is controlled by tightly packing the rectum with gauze which is supported by compresses held in position by a firm T-binder. The deep cut made increases the lumen of the gut and insures perfect drainage of the foul discharge, while enabling the attendant to dress the wound quickly and with but little discomfort to the patient, on account of the division of the sphincter.

In order to obtain the best results, a No. 10 bougie should be passed once or twice weekly as healing progresses, to prevent rapid contraction of the bowel.

Proctoplasty has been resorted to occasionally with fair results. In this operation the rectum is reached from behind by removing the coccyx or turning a part of the sacrum to one side. The bowel is then split in a longitudinal direction at the point of constriction, and the proximal and distal ends are pushed toward each other until the incision appears transverse to the long axis of the bowel, when it is sutured.

Proctoplasty is an unsatisfactory procedure because it is difficult, dangerous, gives poor results, and because it is hard to obtain primary union, on account of the difficulty of keeping the wound free from the discharges. Excision, resection, and posterior proctectomy are all preferable to this operation.

Bacon's operation has been known to give satisfactory results. In this procedure the sigmoid is brought down and anastomosed with the rectum below the stenosis. When union is complete, one blade of a pressure-forceps is passed through the stricture and into the rectum above, while the other is introduced through the new opening into the sigmoid flexure. The handles of the forceps are then locked, and the intervening partition is gradually divided through pressure-necrosis obtained by closing the forceps more and more on each successive day.

Excision of the stricture offers the best prospects for a permanent recovery in this class of cases, but this procedure is frequently declined because it involves an element of danger. I have on several occasions excised the stricture, to the permanent relief of patients who had been chronic invalids for years prior to the operation.

Strictures located in the lower 3 inches of the rectum may be removed with comparatively little danger by *inferior* (perineal) or vaginal proctectomy; but when the stenosis is located in the upper rectum or lower sigmoid, either a modified superior proctectomy (Kraske's) or laparoproctectomy is required. The technic of these operations has been described elsewhere (see Proctectomy).

Following resection when making an anastomosis, sutures or the Murphy button may be employed when it is above the peritoneal attachment, but when below this point, the sutures alone method should be used because the Murphy button is impracticable, owing to absence of the peritoneal covering of the lower rectum.

When excising strictures near the anus, the sphincter muscle should be preserved if possible.

Colostomy is a desirable operation for the relief of colonic and rectal strictures which are so tight as to induce almost complete or absolute obstruction, for the reason that it affords immediate relief from obstipation and other dangerous and distressing symptoms. Because of the reluctance on the part of the patient against this procedure, an artificial anus should not be established until less objectionable methods have been tried and have failed, or excision, resection, or intestinal exclusion have been declined.

I will not discuss the technic of this operation at this time because it has already been described (see Colostomy).

An artificial anus may be *permanent*, when removal of the stricture is refused, or *temporary*, when the opening is made to relieve the obstruction and to prepare the patient for a subsequent excision.

I have a number of patients upon whom colostomy was performed many years ago for the relief of benign stricture, who are leading a comfortable existence at the present time. On a few occasions, following the establishment of an artificial anus, I have been able to heal the ulceration and to increase the lumen of the strictured bowel by irrigation, topical applications, gradual divulsion, and posterior proctotomy to a sufficient degree in warranting the closure of the colostomy opening, which was successfully accomplished. In the last-named cases there was no atrophy and the bowel functionated properly after this reëstablishment of its continuity.

CHAPTER XXXVIII

TREATMENT OF BENIGN AND MALIGNANT TUMORS OF THE COLON AND SIGMOID FLEXURE. FOREIGN BODIES. FECAL IMPACTION. ADHESIONS.

Treatment of Benign and Malignant Tumors of the Colon and Sigmoid Flexure.—The non-operative and surgical treatment of growths located in the large bowel is the same in many respects as that already outlined for the relief of strictures in this region.

Some idea of the most frequent locations of cancer of the colon may be formed by a glance at Fig. 196, which was specially designed to illustrate this point.

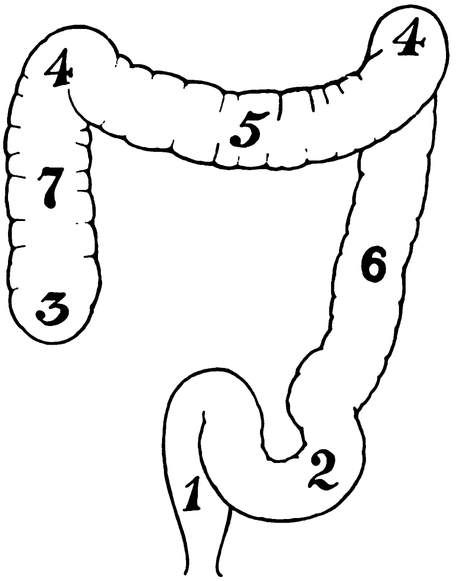

Fig. 196.—Numbered in the progressive order of frequency with which cancer occurs in the different parts of the colon, sigmoid flexure, and rectum.

Resection (see Enterectomy and Colectomy), *exclusion*, and *colostomy*, named in the order of their importance, are the operations which are most frequently resorted to in the treatment of benign and malignant tumors of the lower bowel. I will not do more than make a few brief comments upon these procedures and their relation to the subject under discussion, because their indications and technic have already been given.

Resection is always the most desirable operation when the intestine is blocked by an operable cancerous growth, because the patient will most certainly succumb in a short time to the disease unless the tumor, together with all involved glands, is radically removed.

Exclusion of the obstructed segment of gut is indicated when the trouble is due to an inoperable benign or malignant tumor which induces annoying or complete obstipation, and it is imperative that a new vent be given the feces. The diseased intestine can be cut out by either unilateral (Figs. 181, 182), bilateral (Figs. 182, 186–188), or simple entero-anastomosis (Figs. 177, 178, 180, 197). In the treatment of colonic tumors by exclusion I have obtained the best results where I divided the ileum near the cecum, closed the distal and joined the proximal end to the sigmoid flexure or rectum (ileosigmoidostomy and ileorectostomy), though in a few instances success was obtained by making an anastomosis between the ileum and a part of the colon above the point of obstruction. Colostomy may be resorted to in preference to exclusion when the bowel is extensively diseased and anastomosis would be dangerous, and where it is desirable to irrigate the intestine because of the inflamed or ulcerated condition of the mucosa, but under other circumstances exclusion yields more pleasing results than the establishment of an artificial anus.

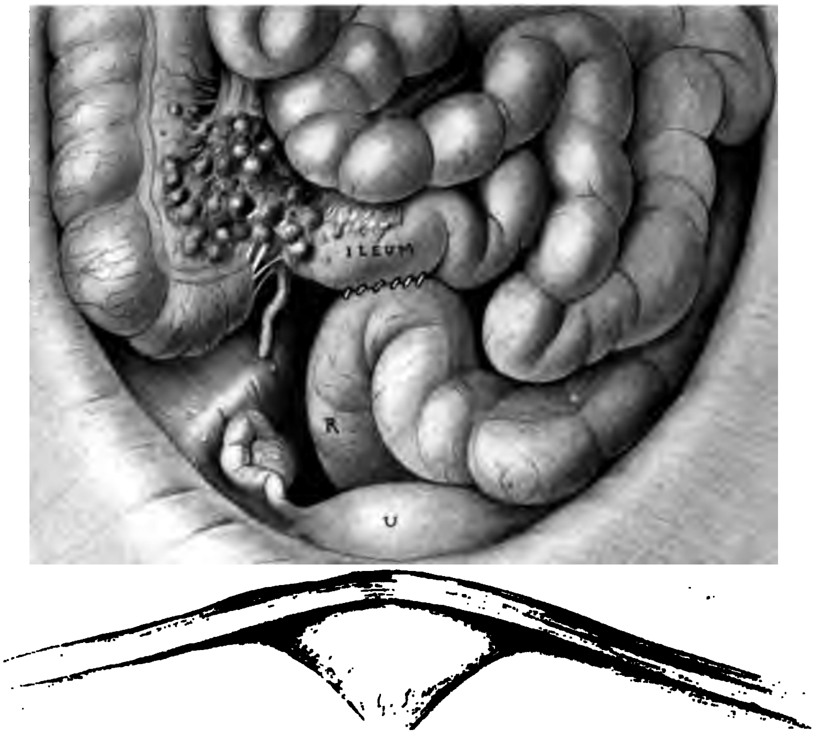

Fig. 197.—Ileorectostomy for the relief of an inoperable carcinoma involving the large and small intestine.

The vast majority of intestinal tumors are cancerous, of the firm narrow annular type, located, as a rule, at one of the flexures of the colon, and quite difficult to remove because the gut at such points is bound down by the mesocolon and the extensive contracting adhesions which require considerable time and trouble for their destruction. Tumors of the small intestine, transverse colon, and sigmoid flexure are not so difficult to remove, because these portions of the intestine have a greater degree of mobility.

In malignant cases a liberal amount of the gut on either side should be removed to lessen the danger of recurrence, but when the neoplasm is benign more conservative work is permissible and a greater saving of bowel.

Every precaution should be taken to prevent the formation of post-operative adhesions, which might of their own accord continue the obstipation. They can usually be forestalled by the prophylactic measures recommended in the chapter devoted to the Treatment of Adhesions. In this class of cases it is of the utmost importance that raw spots upon the viscera and openings in the peritoneum be covered with the omentum or adjacent organs, or stitched up, to prevent bleeding, leakage, or the formation of adhesions.

Small tears may be closed by running Lembert stitches, complete rents, by a double line of sutures, one of which includes all of the intestinal coats and the other the seromuscular layers; and extensive wounds, by resection and anastomosis. For this particular work I prefer an ordinary cambric needle and Pagenstecher's celluloidin linen thread.

The bleeding from small raw surfaces can be quickly and effectively arrested by hot water, iron, adrenalin, or the Paquelin cautery.

Uncomplicated intestinal tumors can be resected in a few moments, but when the neoplasm is large, has extended to neighboring organs, is rigidly bound by adhesions, has formed a fecal fistula, or infected adjacent or remote glands, the operation may require from half an hour to an hour or more.

Resection of a cancerous bowel requires more time and involves a greater amount of danger than the removal of a benign growth because of the presence of more numerous adhesions, and further, because the bowel tears more easily and its contents soil the field of operation.

During and following extensive operations, stimulation with drugs or by hypodermoclysis is sometimes necessary. It is well enough to warm the bed before the patient is placed in it, but I am not in sympathy with the practice of some surgeons who surround their patients with hot-water bottles, because I have known 3 to be burned and suffer greater shock and more pain from the accident than they did from the operation. Following resection, the ends of the divided gut should be approximated, except when they are of unequal size or the bowel is unhealthy. Under such circumstances the ends should be closed by purse-string sutures and lateral anastomosis performed. Except when the saving of time is of the utmost importance, union by the sutures alone method should take precedence over mechanical aids in both end-to-end and lateral anastomosis. Polyp-like growths of the sigmoid flexure and rectum do not, as a rule, require resection, because, with the aid of the sigmoidoscope and the author's intestinal forceps (Fig. 198), they can be quickly removed by torsion, or they may be destroyed by pressure-necrosis by snapping one of the author's valve-clamps (Figs. 225, 226) upon the pedicle of the growth and leaving it there to come away with the stools.

The technic of the different methods of removing the colon and rectum has already been described under the captions of Colectomy and Proctectomy.

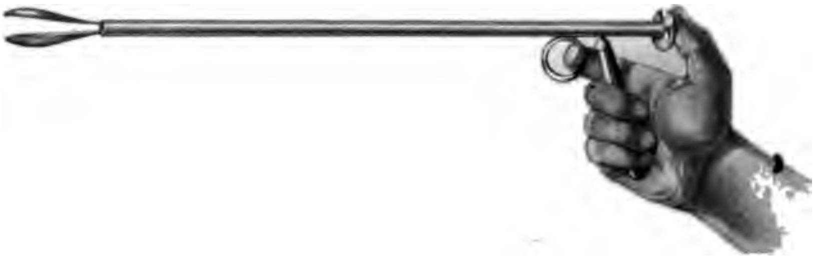

Fig. 198.—Author's intestinal forceps, useful for removing polyps, foreign bodies, dressings, and making topical applications.

Treatment of Foreign Bodies.—In the treatment of foreign bodies which have become lodged in the *small intestine*, and which cannot be freed and moved downward by a coarse diet and the administration of oils, or, if need be, active cathartics, injections, mild friction-massage, and, when there is enterospasm, by hot abdominal fomentations and belladonna internally to relieve irritation and cause the bowel to relax—operative measures are indicated. Ordinarily, otherwise inaccessible foreign bodies can be quickly removed by simply slitting the small intestine (*enterotomy*) or colon (*colotomy*), and lifting them out with forceps, but when they are very large, have become encysted, or caused extensive ulceration, *resection* (*colectomy*) of the segment of gut containing them is advisable. In extreme cases, where they produce almost if not complete obstipation, and for any reason it is unwise to attempt their removal, the obstruction should be relieved by ***enterostomy*** or *colostomy*, according to the location.

Foreign bodies located in the *sigmoid flexure* and *rectum* which cannot be gotten rid of by the non-operative measures above recommended, should be removed through the sigmoidoscope or proctoscope with the author's intestinal forceps (Fig. 198), which are strong and do not obstruct the view. When in the lower rectum, foreign substances which have become firmly imbedded or excite sphincteralgia should be removed after divulsion of the sphincter under general anesthesia. When dilatation does not afford sufficient room, the muscle and the parts backward to the coccyx should be split and the wound closed after the body has been removed. Wooden objects may be removed by means of a screw or gimlet; when of glass, they must be handled with exceeding care, otherwise they may be ***broken*** and cause alarming ***hemorrhage*** from laceration of the parts. When of wire or metal, they may be divided with nippers, if necessary, and then removed in sections. When the offending body is pointed or angular, every precaution should be taken to protect the mucosa from injury by slipping a tube over it. After the foreign body has been removed from the rectum the wound should be sutured, and the abrasions be kept clean, stimulated, and allowed to heal by granulation.

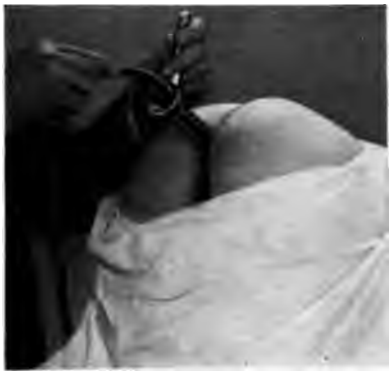

Fig. 199.—Most reliable method of introducing the long colon-tube when administering irrigations and enemata.

Treatment of Fecal Impaction (Coprostasis, Fig. 40).—It is a very easy matter to quickly and easily relieve a patient suffering from a slight fecal impaction low down in the rectum, but it is an extremely difficult problem to determine the best means of bringing away single large putty-like masses or numerous small nodulated scybala which have collected at one or more points along the large bowel, and have remained until they have become encysted or produced irritation and enterospasm, without causing great pain to the patient or serious injury to the bowel. Fecal accumulations in the rectum and lower sigmoid are much more easily disposed of than are those situated higher up in the colon. Impactions in the lower bowel, when of comparatively recent date, can usually be softened and brought away by the aid of warm-water, soap-suds, oil, or glycerin high (Fig. 199) and low enemata, alone or in combination, within a few hours, but when the retention has existed for a considerable time, the injections must necessarily be persistently practised for several days before definite results are to be expected, because the mass is difficult to permeate and remove, owing to its mucous covering and because it excites sphincteric spasm. From what has just been said, it may be inferred that hot injections, because of their soothing action upon the intestinal musculature, are more effective in relieving this class of cases than the introduction of a similar amount of a cold solution (as is sometimes practised), which is apt to excite contraction of the muscular fibers. For many years I have successfully employed the following combination:

℞.	Soap-suds	Oj	4|73
	Castor oil	℥j	30
	Glycerin	℥ij	60

Sig.—Inject into the colon every two hours; to be retained as long as possible.

On a few occasions I have succeeded in breaking up large impacted masses by the injection of from a few ounces to ½ pint of the peroxid of hydrogen, and have then washed out the smaller particles by means of an enema. Fecal impactions located in the sigmoid or rectum can be removed under all circumstances with the aid of a gouge, which chops the mass up so that it can be dislodged and brought away by frequent washings. The gouge, the finger, or the handle of a spoon may be satisfactorily employed in the process of removing accumulations near the anus, but when they are situated in the upper rectum and sigmoid, their breaking up must be accomplished through the proctoscope or sigmoidoscope by the aid of reflected light. In chronic cases, and more particularly where the masses have collected in the cecum and transverse colon, the patient should be given from 2 to 6 ounces of neutralol, liquid paraffin, or olive oil twice daily, to soften the feces and lubricate the bowel, so that they may more easily pass downward to the rectum.

Friction-massage may occasionally be resorted to with advantage in acute impaction to break up or move the masses along the colon, when they are small and movable, but massage and mechanical vibration are contra-indicated in cases where the impaction is extensive and hard and where there is evidence of irritability or ulceration on the part of the bowel. In this latter class of cases, purgatives and cathartics are always contra-indicated because they induce much unnecessary suffering, do little good ordinarily, and occasionally much harm.

Fecal impaction becomes a surgical disease when the measures heretofore recommended fail to accomplish their purpose. In those cases where the accumulations are very large and distend the bowel to a dangerous degree, have become encysted, or have produced an extensive ulceration, and the patient is threatened with perforation and rupture, it is advisable to proceed to their removal at the earliest opportunity by means of enterotomy or colotomy, according to the seat of the impaction. If, however, complete obstruction has already taken place and the patient is in a dangerous condition because of the accompanying distention and the effects of the virulent intestinal flora, the bowel should be opened and promptly drained and the mass be removed at a later date, when the patient is in a condition to withstand the more extensive surgical operation. In extreme cases, where coprostasis is complicated by extensive ulceration or sloughing of the gut, nothing short of resection or enterectomy or colectomy will serve to carry the patient through his illness and effect a permanent cure; but when enterectomy, for any reason, appears to be unsuitable, the blocked segment of gut should be excluded from the fecal current after the manner elsewhere described.

Treatment of Adhesions.--Adhesions and tumefactions alone or in combination with ptosis, angulation, or rotation of the intestine are frequent causes of obstipation, and are encountered most frequently at the cecum, other parts of the colon, or at the sigmoid flexure (Figs. 41–44, 52–55).

In one instance they may interfere but slightly with the regularity of the stools, while in another they almost completely occlude the bowel and make it extremely difficult to secure the necessary evacuations, even with the combined aid of laxatives and copious enemata. There is no guiding rule in operating upon adhesions, because they vary greatly in different cases, and may be single or multiple, narrow or broad, veil-like or thick, firm and non-transparent, bloodless or vascular. Again, they may obstruct the bowel at one or many points by firm contracting bands or agglutination, the intestine being pressed upon or strangulated or drawn into twists or angulations.

The treatment of obstipation induced by adhesions may be prophylactic, physical, or surgical.

Prophylactic Treatment.—It is known that large incisions which admit considerable air into the abdomen, rough handling of the viscera and peritoneum, cauterization, mechanical irritants, wounding of the viscera, and intraperitoneal hemorrhage favor the formation of adhesions, and should be avoided as far as possible during abdominal operations.

Recently many interesting and instructive experiments have been made upon rabbits and other animals to discover a way of guarding against adhesions following intra-abdominal operations, and Pernhorst persistently practised for several days before definite results are to be expected, because the mass is difficult to permeate and remove, owing to its mucous covering and because it excites sphincteric spasm. From what has just been said, it may be inferred that hot injections, because of their soothing action upon the intestinal musculature, are more effective in relieving this class of cases than the introduction of a similar amount of a cold solution (as is sometimes practised), which is apt to excite contraction of the muscular fibers. For many years I have successfully employed the following combination:

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(1901), Vogel (1902–08), Michael (1902), Craig (1904), Richarz (1904), Tixier (1905), and Fromme (1907) are entitled to credit for pioneer work along this line.

Vogel (*Deutsche Zeitschrift f. Chirurgie,* Vol. 63, 1902) advises against mechanical traumatism, the Paquelin cautery, and the spending of too much time in freeing the abdominal cavity of cystic contents, blood, and ascitic fluid, and recommends that a solution of gum arabic be employed to increase the slipperiness of the intestine, and that atropin or the salicylate of physostigmin be administered every three hours following the operation to excite peristalsis and prevent the coils of intestine from remaining in contact long enough to become adherent. He also suggests that the position of the patient be changed from time to time after the fifth day, and that gentle abdominal massage be employed during wound repair, and gymnastics later, to minimize the danger of troublesome adhesions following laparotomies. Vogel carried on extensive experiments with the idea of discovering an anticoagulating agent which would prevent coagulation and agglutination, but failed to find one which was satisfactory.

Craig (*American Journal of Obstetrics,* 49, 1904) endeavors to inhibit the formation of adhesions through leaving 1 quart of normal salt solution within the abdominal cavity to float the intestines and cause them to glide over each other, and by enhancing peristalsis through the administration subcutaneously of from $\frac{1}{60}$ to $\frac{1}{40}$ gr. of the salicylate of eserin during or shortly after the operation, and, later on, by changing the position of the patient frequently to prevent continued contact of the viscera.

Fromme (*Zeitschrift f. Geburtsh. u. Gynaek,* lix., H. 2, 1907) produced abdominal hemorrhage in rabbits 35 times by opening the epigastric vessels, and then closed the abdominal wound, leaving the peritoneum whole in some instances and removing a part of it in others. He found that there was little tendency for adhesions to form, both when the peritoneum remained intact and when raw surfaces were left under aseptic conditions, but that they frequently formed when various bacterial culture infusions were used thirty-four hours previously to infect the blood. He concluded that when sterile blood is absorbed no adhesions follow, but that such complications may be expected when it contains infectious material, whether the serosa has been denuded or not.

Richarz (Inaugural Dissertation, Bonn, 1904) believes that the best prophylaxis against adhesions is to practise strict asepsis, preserve the peritoneum, and moisten it with Favel's solution, or lubricate the damaged serosa with fat and stimulate peristalsis by means of enemata.

Injections are dangerous and should not be administered when the bowel has been torn while separating the adhesions.

Pernhorst (Inaugural Dissertation, Kiel, 1901) maintains that it is important to return even the minutest portion of projecting omentum into the abdomen to prevent its being caught in the wound, to bury all stumps, cover all raw surfaces with serosa, and to accurately approximate the torn edges of the peritoneal coat when injured. He insists that a postoperative temperature usually indicates the formation of adhesions. In this country, raw surfaces are sometimes covered with subiodid of bismuth, aristol, or Cargile's membrane to prevent their becoming adherent to the parietes or an adjacent viscus.

Recently, fibrolysin has been employed a number of times as a preventive against adhesions following laparotomies and also with a view of causing their absorption when already formed. Fibrolysin is composed of a sterilized solution of thiosinnamin and salicylate of soda. It is claimed that the injection of this remedy is painless, causes no unfavorable symptoms, relieves pain consequent upon adhesions, and tends to improve the general condition of the patient, in addition to its effect in favoring the absorption of exudates.

Michael (*Klin. Therap. Woch.*, January 6, 1908) has successfully treated 2 cases of perigastric adhesions resulting from ulcers of the stomach in the following manner: He made two injections (1 cc.) of a solution composed of thiosinnamin, 2 gm.; glycerin, 4 cc.; and distilled water, 14 cc. Subsequently, he injected intramuscularly 1.15 cc. (half a vial) of fibrolysin every second day. In both cases the very severe pains disappeared after 23 cc. of fibrolysin had been employed.

Briefly stated, the best way of preventing postoperative abdominal adhesions is to work quickly, observe strict asepsis, carefully handle the viscera, prevent or arrest bleeding, cover the stump and raw surfaces with peritoneum, resort to chemical irritants and the cautery when imperative only, and follow the operation by changing the position of the patient frequently, by administering the salicylates of physostigmin, atropin, or a laxative to excite intestinal activity, and fibrolysin to hasten the absorption of exudates. Later, if there is reason to believe that adhesions have formed or are forming, gentle massage may be employed to break them up before they solidify.

In addition to the above, a normal sterile salt solution may be left in the abdomen to float the intestine, the bowel may be lubricated with fat or a solution of gum arabic, and denuded surfaces may be covered with the subiodid of bismuth, aristol, or Cargile's membrane by surgeons who favor their use.

Physical Treatment.—Now and then, adhesions which are thin and thread-like or which cause an agglutination of two segments of gut and interfere with the daily evacuation, can be broken up or separated by massage or mechanical vibratory treatment. Such physical measures, however, are ineffective when adhesions are numerous, broad, and strong.

Electricity is useless in the treatment of mechanical constipation due to adhesions in so far as its curative effect is concerned, but the galvanic and sinusoidal currents render valuable aid in the palliative treatment of this complaint by alleviating pain, arresting enterospasm, and quieting reflex disturbances. Physical measures like massage, vibration, and electricity may be successfully employed in the prophylactic treatment of adhesions, if used gently over the abdomen shortly following abdominal operations.

In a few instances, in this type of constipation, I have witnessed improvement follow indoor gymnastics and systematic bodily movements, when regularly practised for several weeks or months.

Surgical Treatment.—Troublesome adhesions which persist in causing obstipation and cannot be overcome by physical treatment, should be operated upon and destroyed at the earliest opportunity, in order to correct constipation and avoid the possibility of complete obstruction later.

Intestinal adhesions invariably require careful handling, and the segments of bowel to which they are attached should be brought into view, that they may be examined carefully, and be destroyed while in plain sight, so as to avoid unnecessary injury to the bowel, which is likely to occur when the work is done blindly. The breaking up with the finger or dividing of adhesions with knife or scissors, when not in view, is a most dangerous procedure and should not be resorted to, except in rare instances, where they cannot be destroyed in any other way.

Veil-like adhesions, the result of recent or remote inflammatory processes, can usually be brought into view and separated by gently wiping the agglutinated segment of intestine first in one direction, then in another. The inclination of the operator to pull the adherent loops apart is great and difficult to resist, but this should never be done, because it is almost certain to cause a tear which will penetrate the peritoneum, if not all the coats of the bowel, resulting in peritonitis or a fecal fistula, if the rent is not most carefully repaired.

Thread-like adhesions are easily broken up with the finger, but narrow or broad and thick non-transparent fibrous bands are more difficult to destroy, and usually require division with a knife or scissors.

When the gut is obstructed by adhesions extending between it and the omentum, the uterus, or a tumor, and they cannot be broken up or severed without extensive injury to the bowel, which would probably result in fecal fistula or death from peritonitis, it is advisable to divide them in such a way that a small piece of the omentum, uterus, or tumor is left attached to the intestine.

When the appendix is involved in adhesions, it should be ligated and removed and the stump inverted or not, according to the technic of the operator.

Adhesions which bind the rectum to the ovaries, tubes, uterus, and bladder, or to the stomach, cecum, transverse colon, or sigmoid flexure, when ptotic, are extremely difficult to destroy because of their location deep down in the pelvis.

When feasible, the involved structures should be drawn upward and the adhesions destroyed under the guidance of the eye, but when this is impossible, they may be separated with a gauze wipe or by rolling the gut between the fingers when soft, or be divided with a probe-pointed bistoury or blunt scissors guided by the finger after they have been surrounded by a ligature to prevent bleeding. The utmost care is always necessary when destroying pelvic adhesions adjacent to pus cavities because they are solid, and the bowel has usually been involved in the inflammatory process, which makes it more friable.

If there is reason to fear infection when adhesions in the lower abdomen are destroyed, a vaginal drain should be inserted. When the colon is extensively involved at a number of points by adhesions which press upon or draw it into acute flexures and twists, so as to render it practically useless, it is advisable to resect a part or all of the large bowel in order to cure the constipation. Lane (*British Medical Journal*, Jan. 18, 1908) has removed the cecum and all or a large part of the colon 39 times, with 7 deaths, for the relief of chronic constipation of this type. I had the pleasure of seeing and talking with several of these patients, who seemed to be doing well, and stated that their constipation had been cured and their general condition greatly improved by the operation.

Thus far I have not found it necessary to remove the entire colon, but would not hesitate to do so if I could not cure my patient by a less radical operation. In deplorable cases of obstipation, where all or a considerable part of the large bowel is permanently incapacitated by the presence of adhesions which are too extensive to admit of destruction, it should be excluded by entero-anastomosis (exclusion).

I have witnessed remarkably satisfactory results follow this operation. I divide the ileum, close the cecal end, and unite the other to the sigmoid or rectum after having previously provided for drainage and irrigation of the excluded segment by appendicostomy or cecostomy.

Some surgeons prefer to relieve obstipation in this class of cases by the establishment of a permanent artificial anus rather than resort to the operation just discussed. Personally, I believe that both resection and exclusion should be chosen in preference to colostomy, because they effectively overcome obstipation and are devoid of the objectionable features which mark the presence of an artificial anus.

Band-like adhesions which bleed should be divided between two ligatures, but when the ligamentous attachments are broad and vascular, they should be ligated and divided in sections or severed after the circulation has been shut off by a *running-and-tie* suture. When the bleeding persists in spite of all precautions, it should be promptly arrested to avoid the dangers of a severe hemorrhage and the formation of new adhesions in case the blood is infected. Spurting vessels should be caught up with artery forceps and ligated or surrounded by a purse-string suture. Moderate oozing can easily be arrested by hot-water compresses, and copious oozing by the application of gauze pledgets soaked in adrenalin or the persulphate of iron applied to the raw surface until bleeding stops.

Hemorrhage from a long narrow tear in the bowel or other viscus can ordinarily be quickly and effectively arrested by a continuous Lembert suture, but when the wound is small and oblong or circular in shape, it can be closed more satisfactorily by a purse-string stitch. Alarming bleeding from extensive wounds in the intestine, which cannot be arrested by the methods already given, may sometimes be controlled by suturing the denuded surface of the gut to the omentum, mesentery, or a neighboring viscus; but this is a deplorable procedure and should not be resorted to except as a last resort, because it implies disabling of the intestine by new adhesions which may be as extensive as those for the relief of which the operation was performed.

Bleeding from rents in the bladder or stomach may be arrested by a running stitch of linen or silk, but a hemorrhage from an injury to the uterus cannot always be so easily controlled, and when it persists, the introduction of one or more deep sutures, which do this organ no harm, is indicated.

Small and large tears and raw surfaces upon the bowel should be carefully sutured or stitched over with the peritoneum, whether they bleed or not, to avoid the formation of fresh adhesions between the bowel and adjacent structures, and other complications, such as peritonitis and fecal fistula; but when injury to the bowel is very extensive, it is sometimes easier and safer to resect than to repair it.

CHAPTER XXXIX

TREATMENT OF ANGULATIONS, DIVERTICULA AND RECTOCELE, ABNORMAL MESENTERY, VOLVULUS, HERNIA, INVAGINATION (INTUSSUSCEPTION)

Treatment of Intestinal Angulations (Flexures).—Intestinal kinks responsible for obstipation are nearly always located in the upper part of the colon or sigmoid flexure. The treatment of such obstructing angulations, depending upon their character (Figs. 41–44, 52–55, 200, 201), may be ***non-operative*** or ***surgical***, but in most instances surgical procedures give the quickest and best results. When the kink is not too sharp, a daily evacuation may be secured and the patient made comfortable by limiting the diet to fluids and semisolids, and prescribing a dinner pill or 1 to 2 ounces of olive oil or liquid paraffin to lubricate the intestine and soften the feces, so that they may pass the obstruction.

Angulations of recent origin induced by inflammatory exudates, which glue the segments of the gut together, can usually be straightened out and the obstipation overcome by friction-massage or gentle vibratory treatment, but when the band is of long standing and is caused by stronger adhesions, such measures will fail to break them up and free the bowel. Under such circumstances much benefit can be derived by the introduction of a Wales (Fig. 195) or other flexible bougie and leaving it ***in situ*** for a period varying from a quarter to half an hour. The treatments should be made two or three times weekly and the size of the instrument gradually increased. The stretching of the bowel and the pressure made in different directions by the bougie in its efforts to straighten out tend to break up the agglutinating adhesions and to free the gut.

Good results may be obtained in much the same way by introducing the modified Barnes bag (Figs. 222, 223) or Hirschmann's dilator (Fig. 224) until one-half rests above and the other below the angulation, and then repeatedly distending the bowel by filling the dilator with gas, air, or water. The bowel may be stretched a number of times in quick succession or the bag may be left in place for a considerable time. I have, on several occasions, observed a decided improvement follow the systematic inflation of the colon through a pneumatic proctoscope, but have recently discarded this in favor of the method above described, because the distention cannot be confined exclusively to the kinked part of the gut, and further, because it leaves the bowel filled with air, which causes prolonged colonic pain.

On a few occasions I have attempted to straighten out the bowel by introducing the proctoscope or sigmoidoscope and packing it with cotton tampons, but the results were unsatisfactory because of the pain which followed, and the considerable time required to introduce and remove the tampons.

When the non-operative measures already discussed fail to lessen the degree of angulation and improve the constipated state, an operation is indicated and should be performed at the earliest opportunity. Naturally, the nature of the operation required cannot be determined until the abdomen has been opened and the cause, extent, and number of kinks have been noted. When the flexure is new and induced by inflammatory exudates which glue the segments of bowel together, it can usually be corrected by rolling the gut between the fingers or by wiping the adhesions away with a piece of moist gauze. Traction upon the gut is dangerous because a tear is likely to follow, and should not be resorted to except when other measures fail to accomplish the desired result.

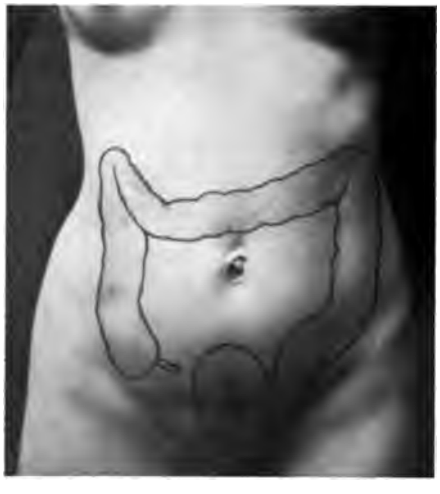

Fig. 200.—Showing angulation of hepatic flexure caused by adhesions.

When angulation is the outcome of narrow, broad, or fan-shaped adhesions between two pieces of intestine, or the bowel and its mesentery, the omentum, some other organ or a tumor, nothing short of a division with a knife or scissors will release the gut (Figs. 200, 201). It is better to leave a piece of the omentum or tumor attached to the bowel than to do extensive dissection and injure the gut, which, even if repaired, would in all probability be followed by a fecal fistula. Vascular adhesions should be ligated and divided between ligatures.

If the gut has been torn during the operation the rent should be immediately repaired by introducing a continuous Lembert suture (linen or silk) when the peritoneal coat is involved, and both through-and-through seromuscular suture lines when the tear is complete.

Occasionally, when the rents are extensive, it is advisable to *resect* the injured segment of bowel and unite the divided ends by end-to-end or lateral anastomosis. The same procedure may be followed in cases where, as a result of peritonitis, typhoid fever, or ulcerative colitis, numerous kinks have been produced by adhesions which are so extensive that they cannot be divided.

In those deplorable cases where adhesions are numerous and firm, while segments of the bowel are matted together and cannot be detached except by dissection and extensive injury to the gut, the blocked part should be excluded by making a direct communication between the pieces of the intestine immediately above and below it. Under similar circumstances, when the obstruction is acute and the vitality of the patient is low, one is justified in establishing an artificial anus above the point of obstruction, and in doing a radical operation at some future time when the patient is stronger.

In cases where angulation is the result of an elongated mesentery, the latter should be shortened by infolding and suturing it in two or three places, but when due to a displaced and ptotic section of the intestine, enteropexy, colopexy, or sigmoidopexy should be practised after the kink has been straightened out. When caused by a very short mesentery, the latter can sometimes be divided sufficiently to give relief without impairment to the circulation; but when this is not feasible, the peritoneum on either side may be divided longitudinally and then sewed up in a transverse direction (Tuttle) in order to give more freedom to the gut. To minimize the danger from the formation of troublesome new adhesions, all raw surfaces should be covered with a solution of gum arabic, aristol, the subiodid of bismuth, or Cargile's membrane; or the peritoneum should be made to cover them, and a laxative, or eserin, should be administered immediately after the operation and each day succeeding, in order to excite peristalsis and prevent the bowel from resting in one place long enough to become adherent.

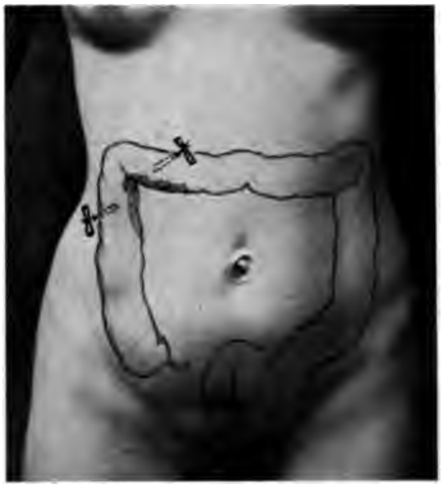

Fig. 201.—Showing method of overcoming a sharp angulation at the hepatic flexure.

Treatment of Diverticula and Rectocele.—Intestinal diverticula may aggravate the constipated state by forming a place for the lodgment of fecal accumulations which press upon or angulate the bowel by becoming inflamed (diverticulitis) and exciting enterospasm, or by causing a pericolitis or sigmoiditis, which result in abscess, thickening of the gut wall, and formation of adhesive conditions, all of which tend to restrict peristalsis and the mobility of the intestine.

Nothing can be accomplished by non-operative measures in the treatment of diverticula beyond the slight comfort afforded the patient by the administration of laxatives to secure the necessary evacuations, the washing out of the bowel to free it from impacted feces and toxins, and the local application of heat or cold or the administration of morphin to alleviate the suffering. When obstipation is caused by Meckel's or any other diverticulum which is long and narrow and obstructs the fecal current by pressing or pulling upon the bowel or causing strangulation, it should be treated in the same way as a band-like adhesion and severed, after being ligated. After it has been destroyed the bowel may be left alone when its circulation is not impaired, or resected if it is necrotic.

Hollow tube-shaped diverticula are removed in a manner similar to that of the appendix—viz., ligated, cut off, and cauterized. The stump may or may not be inverted and buried by Lembert stitches.

Small single diverticula may be excised and the wound closed by a double layer of linen sutures. On the contrary, when they are large and single, or multiple and of variable size, excision of the individual sac is impracticable because of the time required and the extensive injury to the bowel, which in all probability would result in a fecal fistula or peritonitis.

Under such circumstances the affected segment of bowel (usually the sigmoid) should be resected or excluded, or a vent should be made for the feces at a short distance above the uppermost diverticulum. When a diverticulum or the bowel to which it is attached is gangrenous, it should be removed or brought up and stitched in the wound to form an artificial anus, which can be closed at a future time.

Where the segment of bowel containing the diverticula is adherent to other loops of the intestine or is bound down by adhesions so that it cannot be resected, it should be excluded and a short cut made for the fecal current by simple entero-anastomosis or bilateral exclusion. However, the most satisfactory treatment is to excise small diverticula, and when they are extensive to resect the bowel with which they are connected. I have successfully removed 12 inches of the intestine, including the lower descending colon and a part of the sigmoid flexure, and cured a man sixty-five years old who had suffered for many years from acquired multiple diverticula. On another occasion I resected 8 inches of the sigmoid to relieve a gentleman of an abscess, the result of a chronic diverticulitis and perforation, which was discharging through the rectum. Both these patients made uninterrupted recoveries and have remained perfectly well since the operation.

I have operated several times upon patients suffering from diverticula or pouches located in the rectum. In 1 case, that of a lady aged fifty, I found a diverticulum the size of an egg which opened into the rectum in the posterior median line, 2 inches above the anus. The operation in this instance consisted in making a posterior median incision, removing the coccyx to obtain room, excising the diverticulum at its jointure with the bowel, and inclosing the opening and the outer incision with chromicized catgut. Part of the wound broke down at the end of a few days, continuing to discharge for two or three weeks, when it healed.

I have also successfully operated on a girl of twelve and a man twenty-six years of age who suffered from posterior rectocele. In both cases the pouches formed owing to the congenital absence of the coccyx. In the first, the rectocele was obliterated by scarifying, infolding, and suturing the posterior rectal wall, while in the other it was destroyed by removing it along with a longitudinal strip of the rectum, after which the wound was closed with chromicized gut. On two other occasions I have succeeded in curing persistent obstipation by narrowing and shortening the anterior rectovaginal septum and obliterating rectoceles which projected into the vagina and formed an ideal lodging-place for the feces. Small colonic and rectal diverticula can also be gotten rid of by scarifying the bowel, inverting, and suturing it (*colo-* and *recto-plication*).

While operating for the cure of diverticula located within the abdomen, other forms of mechanical obstruction, such as adhesions, angulations, and enteroptoses, etc., should be sought for and corrected, in order to secure permanent relief.

Treatment of Abnormal Mesentery.—(See Treatment of Adhesions and Angulations.)

Treatment of Volvulus.—Much can be accomplished toward keeping the bowel open and relieving distress from gas pains in patients who suffer from a partial obstruction induced by a twist in the bowel (Figs. 52–54); but, viewed from a curative standpoint, volvulus is strictly a surgical disease. In chronic cases, when operative procedures are declined, the diet should be controlled and the patient be permitted to consume only liquid, semisolid, and other foods which will leave but a small amount of undigested residue. Bulky foods and edibles which cause the feces to become dry and hard should be prohibited, while water and vegetable oils should be prescribed often and in liberal amounts, with the object of softening the evacuations and lubricating the intestine. When, in spite of the above treatment, impaction takes place above the twist, foods and other laxatives should be administered in proper amounts and as often as the exigencies of the case demand.

When the obstruction is in the colon, much relief is to be had from copious high enemata of hot water or oil. For the relief of acute attacks due to enterospasm, where obstipation is almost complete and there is much suffering from gas distention, I know no remedial agents which will add so materially to the patients' comfort as will continuous hot abdominal fomentations, and the administration, three or four times daily, of diminutive doses of belladonna and opium. The former soothes the bowel and relieves irritation, and the latter diminishes peristalsis and encourages the contracted muscular fibers to relax.

Massage and mechanical vibration are of little service in this class of cases, and distention of the bowel with gas or air is undesirable as well as dangerous, and should not be employed except for the purpose of locating the obstruction. In both chronic and acute obstruction resulting from volvulus, while there is no indication of serious changes taking place in the intestine or its mesentery, one may postpone operating and try to relieve the patient by frequent changes of position and the employment of the therapeutic measures already discussed; but under no circumstances is the surgeon justified in attempting to give relief by the brutal method of forcing the hand into the bowel.

Patients suffering from acute or chronic volvulus, who desire permanent relief from their trouble and are willing to take their chances, should be operated upon at once; since most twists are left sided and located in the lower abdomen, they can be easily and quickly reached through a free median incision made midway between the umbilicus or pubes or through the left rectus on the same level.

When there is great distention and the condition of the patient is serious, *enterostomy* or *colostomy* is indicated to permit of drainage and washing out of the accumulated poisons, with the hope of obviating secondary obstruction from paralytic ileus, leaving the more extensive work to be done until a more desirable time. When it is seen that the vitality of the twisted segment is lost, the intestine should be brought out, stitched in the wound, and amputated if there is cause for haste, or resected and the ends anastomosed when the patient's condition is favorable.

In chronic cases the twist can often be unraveled by lifting it up or changing its position, by gently separating agglutinated segments, or by dividing bands of adhesions which bind it to other parts of the intestine, some other organ, or the parietes.

When adhesions are too numerous and extensive to be destroyed, the involved segment of gut should be *resected* (colectomy) or, preferably, *excluded* by entero-anastomosis, after the plan elsewhere described.

In cases where the gut has been successfully untangled, it invariably has a tendency to return again to its unnatural position when released, hence it is necessary to suture it to the abdominal wall or other organ to prevent a relapse.

Treatment of Hernia.—When partial or complete obstipation results from a rupture of any sort, the damage should be repaired at the earliest opportunity. Because of the many varieties of hernia and of the numerous operations which have been suggested for their relief and cure, their discussion would be out of place in a work of this kind, hence the reader is referred to the standard works of De Garmo, Marcy, and others upon the subject of hernia and its treatment.

Treatment of Invagination (**Intussusception**).—*Acute* intussusception occurs most frequently in infants and young children, affecting, as a rule, the small intestine or the ileocecal valve, whereas *chronic* invagination (Figs. 56, 57) is met with more often among adults and most frequently in the colon, more especially at the sigmoid flexure.

Acute intussusception is exceedingly dangerous, and when it is not promptly relieved, a fatal termination may be expected.

In acute cases all foods should be discontinued except those administered in the form of enemata. When the patient is seen early and there are no urgent manifestations, an attempt should be made to locate the tumor and to reduce the invagination by gentle friction-massage or by changing the patient from one position to another, with the hope that the telescoped piece of gut will slip out.

When the condition of the patient is aggravated and manipulation is rendered impracticable because of the rigidity of the abdominal muscles and enterospasm, much can be done to counteract these conditions by the administration of copious high hot-water enemata or oil injections, and the application to the abdomen of hot fomentations, with administration of belladonna and opium alone or in combination, measures which tend to soothe the muscular fibers of the intestine and cause them to relax, thereby diminishing intestinal irritation and enabling the physician to manipulate the diseased bowel with greater ease.

In case the above-described procedures fail to accomplish the desired result, an attempt should be made to disinvaginate the bowel by pressure exerted from below by means of inflation or distention of the intestine with air, gas, or water.

The distending agent must be under perfect control and enter the bowel slowly. It should be introduced under pressure and while the patient is under the influence of a general anesthetic, in order that it may meet with the least resistance and not give rise to pain.

Water may be injected by means of the Davidson, piston, fountain syringe, or the irrigating apparatus (Fig. 104) described elsewhere. The container for the water should never be more than 3 feet higher than the patient, nor should great force be exerted for its introduction into the bowel.

Air and *gas* can be quickly and satisfactorily introduced by means of a colon-tube connected with a tank, or, when air is employed, it may be projected by means of a hand-bulb and tube.

Some years ago I made a large number of experiments to test the strength of the bowel in both infants and adults with the distending agents named above, and found that it was much easier to rupture the intestine than I had at first anticipated. I came to the conclusion that this method of treating intussusception is extremely dangerous even under favorable conditions, and still more so when the bowel is necrotic. It is unsafe except in the early stages of the disease, and then must be used with great caution.

Naturally, inflation is impracticable when the small bowel is involved because of the obstruction offered by the ileocecal valve to the passage of gas and water.

Distention should cease when less pressure is required to inject the water, gas, or air, because this indicates that the telescoped bowel has been disinvaginated or that rupture has occurred.

Valuable time should not be lost in attempts at relief by non-operative measures, after it becomes evident that the circulation of the bowel is seriously impaired and the patient is being poisoned by virulent bacteria, otherwise he will lose the chance of recovery which would have been his had an operation been performed.

If when first seen the sufferer is troubled with fecal vomiting and is in a state of shock, the stomach should be washed out and reaction be encouraged by wrapping him in hot blankets and injecting liberal amounts of brandy into the rectum before the operation is begun.

Except when there is some special reason for doing otherwise, a liberal median incision made between the umbilicus and the pubes will prove the most useful for operations designed for the relief of intussusception.

If the tumor, on exposure, is found to be agglutinated, it should be separated from adjacent viscera, withdrawn from the abdomen, and walled off with gauze packs. If the examination of the intestine shows that its vitality is not seriously impaired, an attempt should be made to disengage the invaginated segment.

The swollen and edematous bowel should be held with the left hand, while the right, beginning at the lowermost point of the telescoped intestine, gradually works upward by successive squeezing and relaxing, or a "milking" process, and pushes the invaginated gut along until it has been dislodged. This process may require but a few seconds when the intussusception is slight, or several minutes when a considerable part of the bowel is invaginated. The milking manipulation serves both to reduce edema and also to shove the bowel upward.

The temptation to pull the bowel out is always great, but heavy traction should never be resorted to because it is exceedingly dangerous when the bowel is necrotic, and no good will result because of the adhesions which have formed between the peritoneal coats.

Dislodgment can occasionally be greatly hastened by separating adhesions found at the point of invagination with the handle of a scalpel or blunt-pointed scissors, before an attempt is made to withdraw or force the telescoped segment upward.

Once the invaginated gut has been freed, the contents of the intestine above should be squeezed into the healthy bowel below, in order that the contained poisons and feces may find their way out, and by so doing lessen the danger of a second obstruction from paralytic ileus.

When the vitality of the intestine is found to be irretrievably lost, the necrotic segment should be resected and the healthy ends of gut united by end-to-end or lateral anastomosis. Should the condition of the patient be such that a prolonged operation is unadvisable, immediate drainage may be established or an artificial anus may be formed.

In *irreducible* invagination, where the vitality of the gut is not seriously impaired, drainage of the bowel and obstruction can be quickly obtained by entero-anastomosis, but this is not the operation of choice, except when there is reason for great haste, because it permits the affected segment to remain in its unnatural position as a possible source of future trouble.

In my opinion *colostomy* is preferable to *exclusion*, because the diseased gut is removed and the artificial anus can be closed at a later date, as desired by the patient.

At first thought, resection and anastomosis appears to be the most rational operation for the cure of irreducible invagination, but a study of the statistics of this procedure shows that it is not the operation of choice, because it is followed by an exceedingly high mortality in young children, when a considerable portion of the gut is telescoped and when the patient is in a serious condition at the time of operation.

The operations of Maunsell or Barker are preferable to resection because they can be performed in a shorter time, are accompanied and followed by less shock, rarely prove fatal, and accomplish a perfect cure.

Maunsell reaches the invaginated mass through a longitudinal incision made through the outer tube of the intestine; he then transfixes it at its upper extremity with two straight needles threaded with horse-hair and amputates it; the stitches which pass through the entire mass are then hooked up in the middle, divided, and tied, which unites the intussusceptum to the intussuscipiens. This operation can be varied by using linen or silk in place of horse-hair, and by uniting the divided ends by one of the forms of intestinal suture elsewhere described.

Barker first stitches the intussuscipiens to the intussusceptum at the point of infolding to insure accurate union of the peritoneal surfaces, and then opens the bowel and amputates the invaginated mass after from four to six stitches have been introduced to arrest bleeding and cause approximation of the serous surfaces of the divided ends.

Paul opens the outer tube in a manner similar to that of Maunsell and Barker, then incises the intussusceptum and introduces a metal spool, around which the gut is ligated and then amputated. This procedure is impracticable when the bowel is greatly swollen because there is no room for the introduction of the spool.

Baracz has succeeded in relieving irreducible ileocecal invagination by means of bilateral exclusion, a procedure which is rarely indicated. It is well to bear in mind what has been stated elsewhere, to the effect that drainage must always be provided for the piece of gut which has been cut off from the fecal current.

Chronic or recurrent invagination frequently induces obstipation, gas pains, and local soreness, but rarely gives rise to manifestations sufficiently urgent to demand immediate operation. Individuals who suffer from this type of constipation sometimes have natural and regular movements because the gut may not become invaginated, or they may suffer from obstipation year in and year out in those cases where the bowel always becomes telescoped during the straining incident to defecation. In some instances the invagination recedes when straining is stopped or when the patient assumes the recumbent posture, but in others the gut may remain fixed as the result of adhesions, rendering it difficult at all times to secure the coveted daily evacuation.

Occasionally, the condition of patients suffering from chronic invagination of the colon or sigmoid can be improved by having them diet, wear abdominal supporters, and indulge in mild forms of exercise, while at the same time massage, mechanical vibration, or electricity are employed to strengthen the abdominal wall and the intestinal musculature.

When this line of treatment fails to accomplish the desired result an operation should be performed and the bowel disinvaginated, something being done at the same time to prevent it from becoming telescoped in the future. Recurrence can be quickly and safely prevented by fixation of the small intestine (enteropexy), the cecum (typhlopexy), the colon (colopexy), the sigmoid (sigmoidopexy), the rectum (proctopexy, rectopexy) to the anterior, lateral, or posterior abdominal parietes at one or more points to take up the slack, so that the bowel cannot again become invaginated.

In chronic cases, where the intussusception is due to an elongated mesentery, a good result can sometimes be obtained by infolding or taking tucks to shorten it (see Mesopexy), and, when necessary, by suspending the bowel with a few stitches.

When a chronic obstipation is induced by an excessively long piece of gut which becomes telescoped, it can be overcome by resection and anastomosis, or by resection and the formation of an artificial anus, or by an anastomosis made between the segments of bowel situated above and below the part which becomes invaginated. On account of the danger or annoyance connected with these procedures, I very much prefer to obviate recurrence by intestinal fixation, done according to one of the plans outlined in the surgical treatment of intestinal ptosis.

Invagination is frequently induced by or associated with general enteroptosis (Glénard's disease), and it is necessary to replace and fix other prolapsed organs in order to obtain a complete cure of the obstipation, auto-intoxication, and the many other distressing affections which accompany this ailment.

Some years ago (*American Journal of Surgery*, April, 1895) I reported 25 cases of constipation induced by chronic invagination of the sigmoid flexure, cured by suspension of the sigmoid to the abdominal wall, and since then have successfully relieved in the same way more than twice that number. Consequently, I have no hesitancy in recommending colopexy and sigmoidopexy (to be described further on) for the relief of this type of constipation (obstipation). The operation affords immediate relief in some instances, but in the majority of cases, after the invagination is cured, it is necessary to give a postoperative course of hydrotherapy, massage, vibration, or electricity to strengthen and excite the sluggish bowel to greater activity.

The technic of these procedures has been given in detail.

CHAPTER XL

TREATMENT OF SPLANCHNOPTOSIS (GENERAL ENTEROPTOSIS, GLÉNARD'S DISEASE)

General Remarks.—Obstinate constipation is always a troublesome manifestation of both splanchnoptosis and the special forms of enteroptosis (Figs. 58–61). With the possible exception of cancer, I know of no other affection which causes more misery and which is more difficult permanently to relieve than general enteroptosis or Glénard's disease.

Owing to the far-reaching effects of this complaint, many things must be taken into consideration when outlining a plan of treatment for its relief and cure. A study of the numerous and varied symptoms which accompany enteroptosis, general and special, will at once convince the astute observer that something more in the way of treatment is necessary than the mere restoration of the ptotic organs to their normal positions.

The manifestations of visceral ptosis vary greatly in different cases, and this renders it necessary to prescribe a line of treatment suitable to individual requirements.

Naturally, the condition of a patient suffering from gastroptosis, colonic ptosis, or other special forms of enteroptosis is neither as deplorable nor as difficult to relieve as when all the organs have been displaced downward. Nearly all patients who suffer from visceral ptosis in any form require both *local* and *general* treatment, in order to overcome the ptotic condition of the organs and to correct digestive disturbances, symptoms of auto-intoxication, and other associated manifestations.

I have treated a few individuals whose obstipation immediately disappeared upon the restoration and fixation of the displaced or wandering viscus in its natural position, but I have handled many more who, in addition to this, required a systematic postoperative course of massage, electricity, mechanical vibration, or hydrotherapy, together with a suitable diet to establish the regularity of the movements and overcome the neurotic state of the patient.

Unsatisfactory results, in so far as the constipation and most other symptoms are concerned, are sure to follow when one organ is fixed up and another is left down, consequently the treatment or operation should be directed toward the restoration of all the ptotic organs.

It not infrequently happens that the patient is suffering not only from ptosis, but also from catarrh or ulceration of the intestine, and under such circumstances simple fixation of the colon would not effect a cure. Consequently, it is advisable to perform colopexy and then provide for through-and-through drainage by means of appendicostomy, right-sided colostomy or cecostomy, with an arrangement for irrigating the small intestine (author's operation). My methods of performing these operations have been fully described elsewhere.[1]

Now and then I have encountered a case where the stomach, the transverse colon, the sigmoid, or other viscus were markedly displaced downward, while the kidney, liver, or spleen were ptotic to a minor degree. Under such circumstances I have known good results to follow the fixation of the former by operation and the restoration and retention in place of the latter by the aid of one of the mechanical supports hereafter to be discussed. The treatment of splanchnoptosis, as well as the special forms of enteroptosis, ptosis of the stomach, colon, sigmoid, kidney, liver, or spleen may be either *non-operative*, *surgical*, or both.

Non-operative Measures.—Most ptotic subjects have a great dread of an operation, consequently it is advisable, in the first place, to aim at a cure by non-operative measures, but when these, after a fair trial, fail to improve the condition of the patient, the displaced organs should be restored to, and fixed in or as near their normal position as is possible by means of the surgical procedures hereafter to be described. I have frequently observed rapid improvement follow after both these methods of treatment.

Some of my patients derived great benefit from a preparatory treatment devised to improve their general condition, and also from a post-operative treatment designed to free them of the consequences of a chronic intestinal intoxication, to strengthen the musculature of the bowel, and to stimulate the intestinal glands to greater activity.

The following are the principal indications for treatment in all forms of enteroptosis:

1. Replace and retain the ptotic viscera where they belong.
2. Regulate the diet, improve nutrition, and add to the fatty deposits adjacent to the viscera.

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[1] Gant, *Diseases of the Rectum and Anus*, third edition; "Appendicostomy and Cecostomy for the Relief of Chronic Diarrhea," report of 9 cases, *Boston Med. and Surg. Jour.*, Sept. 6, 1906; "Local and Surgical Treatment of Chronic Diarrhea," *New York Medical Journal*, Aug. 15, 1908.

3. Regulate the bowels.

4. Strengthen the abdominal muscles and intra-abdominal musculature, the suspensory ligaments, and increase abdominal tension.

5. Diminish intestinal auto-intoxication by stimulating the emunctories—lungs, kidneys, and bowel—to greater activity.

6. Improve the general health.

Methods of Restoring and Retaining Ptotic Organs and Viscera in their Normal Position.—Individuals who suffer from splanchnoptosis or special forms of enteroptosis cannot be essentially relieved, and still less cured, unless the displaced organs are held in place all or part of the time. It is lost labor to attempt relieving these patients by other methods of treatment before the dragging upon the nerves and vessels of the part has been stopped. In some cases it is easy to restore and keep an organ where it belongs, in others, where displacement is marked or the organ is enlarged, it is exceedingly difficult, and in still others, where the ptotic organ has dropped down deeply into the pelvis and through the formation of adhesions has become firmly attached to another viscus, it is quite impossible, except by operation. When a ptotic viscus cannot be replaced, it should be restored as nearly as possible, and the amount of relief secured will be proportionate to the degree to which this has been accomplished. The ptotic abdominal organs and viscera can best be replaced and retained in position in one of three ways: (*a*) By the aid of mechanical appliances; (*b*) by rest in bed with the hips elevated and other therapeutic measures; (*c*) by operation. The surgical treatment of splanchnoptosis will be given a little further on, under the individual headings of the special forms of enteroptosis.

Mechanical Supports.—Since Glénard first recommended his *elastic hypogastric belt* to support the viscera in cases of enteroptosis, a large number of mechanical supports, such as belts, trusses, stocks, girdles, binders, pressure-pads (pledgets), plaster jackets, corsets, and bandages have been devised for the same purpose, some designed for the relief of splanchnoptosis, and others for the special forms of enteroptosis. Some of these devices have given satisfaction, while others have already been discarded because they proved harmful or utterly useless.

Glénard, Aufrecht, Phillip, Landau, Ssaweljew, Rolgans, Newmann, Byron Robinson, Rose, Aaron, Paezoldt, Spivack, Treves, Morris Longstreth, Mumford, Gallant, and others have invented mechanical supports of one kind or another which have been favorably received, but which, for lack of space, I will not attempt to describe in detail.

Some physicians have obtained very good results in the treatment of enteroptosis by the use of properly applied roller-bandages composed of muslin, canton-flannel, silk elastic, and flexible linen. Jean, linen, canvas, leather, rubber, corset material, plaster of Paris, adhesive, and mole-skin plaster have one and all been employed either alone or in combination in the construction of abdominal supporters.

Mechanical supports designed for the relief of general enteroptosis, to be effective, should conform to the lines of the body while breathing, walking, and defecating, and at the same time they should be sufficiently firm to retain the ptotic organs in position at all times.

In selecting a mechanical support, it should be chosen with a view to the case in hand, and care should be taken to have it composed of a suitable material, properly made, and of a kind to retain the displaced viscera in position when adjusted (Fig. 202). *One cannot be too careful in fitting a belt, corset, or other mechanical aid*, otherwise the ptotic organ may not be completely restored to its normal position, and the patient will not be benefited.

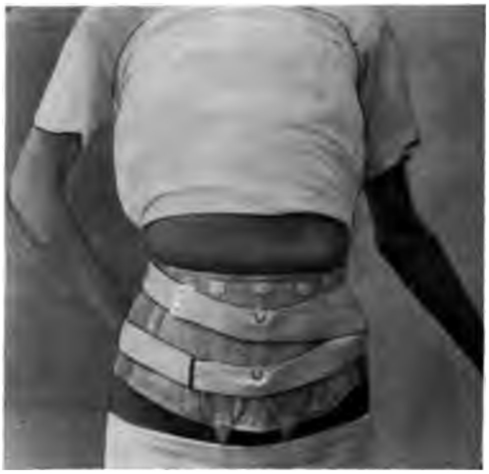


Fig. 202.—Showing correct method of applying the binder used by the author.

Beal (1897) demonstrated by means of transillumination that the stomach sometimes remains in its ptotic position in spite of the presence of a lightly adjusted bandage, and it is not impossible that other organs act similarly or worse, especially when the support has been adjusted in a careless manner. The opinion prevails that enteroptotic subjects invariably have a pendulous belly (Fig. 60), but such is not the case. It is true that the lower abdomen bulges more or less in persons who suffer from splanchnoptosis (Glénard's disease, Fig. 59), but in many cases of hepatoptosis, nephroptosis, or colon ptosis there is no appreciable projection of the lower abdominal wall.

It is impossible to make a supporter which will prove effective under all circumstances, because in one case there are several organs to be retained in position, while in another but a single viscus is in need of support, and in still other cases one organ may be but slightly displaced, while another has totally collapsed and needs special attention. Again, it is often true that a bandage found satisfactory in the treatment of fat enteroptotic subjects, is worthless in the handling of the same condition in emaciated individuals.

The broad part of an abdominal binder, bandage, corset, etc., to give the best results, should extend from the symphysis to the umbilicus, so that it will hold up the pendulous belly, diminish abdominal tension, and lift the ptotic organs upward when adjusted. Abdominal supports must be worn for weeks or months; they should be covered with some soft material which will not irritate the skin, and should have back straps to prevent them from wrinkling and exerting undue pressure upon bony points. Broad binders which completely encircle the body are more uncomfortable and accomplish less toward retaining ptotic organs in position than bandages which are broad in front and fastened behind with straps or laces.

Supports made of plain adhesive or mole-skin plaster (zinc oxid) are objectionable for permanent use because they irritate the skin, press unduly upon bony prominences, require frequent changing, and cause excruciating pain through the pulling upon the skin and hairs incident to their removal.

Rose's binder (Figs. 203, 204) is the most generally used of this type of supporter. It undoubtedly retains the ptotic viscera in position, but at the same time makes the patient very uncomfortable, and because of this I do not employ it except in the clinic as a substitute for more expensive supports, and in private practice as a makeshift until a more comfortable and equally effective bandage can be obtained. In order to determine if a support will be beneficial, it is well to follow the plan of Aaron: Stand behind the patient, reach around and lift up the lower abdomen; if this procedure produces a sensation of relief and the patient feels less comfortable after the organs have been dropped, it indicates that a binder is needed. Enteroptotic individuals should be carefully examined while in the sitting and erect postures, so that the degree of displacement of the different organs may be noted; but while measurements are being taken, the patient should be placed on his back, with the foot of the bed or the hips elevated, in order to afford the displaced viscera an opportunity to slip back into position. The measurements can then be taken with a piece of tape, or models of the abdomen or back can be made with the aid of pliable lead strips, as suggested by Aaron.

In splanchnoptosis of moderate degree, associated with a decided displacement of the kidney or other organ, it is at times advisable to attach to the circular binder a spring or pressure-pad, which will retain it in position.

In the treatment of special forms of enteroptosis care must be exerted not to support one viscus at the expense of another. As far as may be, the pressure should be equally distributed among all the ptotic organs. Individual pressure-pads may be soft or firm, but must be smooth outside and composed of material which will cause the least possible irritation.

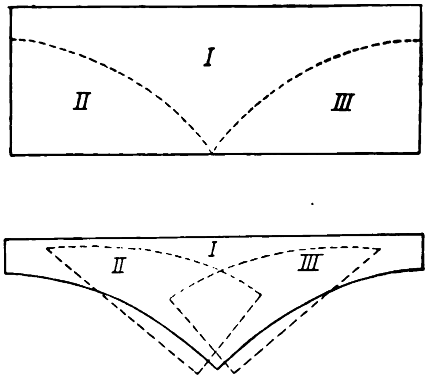


Fig. 203.—Pattern for cutting the Rose plaster abdominal binder.

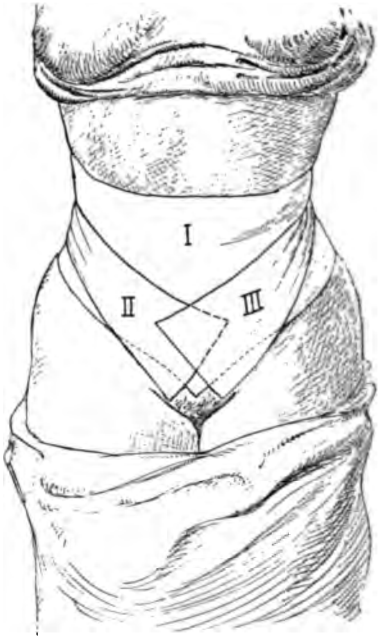


Fig. 204.—Rose plaster binder in position.

Properly constructed and accurately applied, mechanical supports render valuable service in many ways in the treatment of both the general and special forms of enteroptosis. They limit the motility or the descent of the ptotic viscera, improve digestion, encourage more frequent bowel movements, lessen renal, vesical, and other abdominal disturbances, remove the dragging upon the vessels and nerves contained in the suspensory ligaments, and thereby improve the circulation in the ptotic organs, diminish pain and sensations of fatigue, and either directly or through reflex action improve the motor, sensory, and secretory functions of the nervous system.

Well-fitting binders afford physical relief as soon as applied, and mental relief promptly follows because the patient feels that at last he has been started on the highroad to recovery.

Mechanical supports not only do away with "that tired feeling" complained of by enteroptotic patients, but also enable them to attend to their business and social duties, as well as indulge in walking and other forms of exercise which serve to improve the appetite, facilitate digestion, and distract the mind from their troubles. Exercise in the open air further helps to improve the condition of these sufferers because it increases the intake of oxygen, thus minimizing the effect of auto-intoxication, brings about a natural bodily fatigue which encourages sleep in those who suffer from insomnia, and last, not least, strengthens the abdominal muscles. Mechanical appliances which really support the abdomen are of the greatest service to persons who suffer from Glénard's disease complicated by a very fat abdomen, pendulous belly, separation of the recti muscles, marked dilatation of the stomach or intestine and umbilical hernia, and to those who have undergone an abdominal operation.

While a great deal can be justly said in favor of artificial supports in the treatment of the general and special forms of enteroptosis, it must be admitted that they are often objectionable for this purpose. Many patients refuse to wear belts, bandages, and corsets because they are cumbersome and irritate the skin, lose their shape, slip out of position, hold one organ in place while permitting another to drop below its level, prevent deep breathing, or interfere with the action of the abdominal muscles during defecation. Some individuals fail to avail themselves of the benefit to be derived from a mechanical support because of the difficulty of obtaining it or because of the original outlay and the expense of renewing it every little while.

Another serious drawback to artificial devices designed to replace and retain ptotic organs is the very great difficulty encountered in getting them properly made and fitted. Improperly constructed and inaccurately adjusted binders, corsets, pads, and other supports do no good and much harm, because they induce excoriation of the skin, pain, nausea, vomiting, tachycardia, disturbance of the gastro-intestinal tract through pressure upon it, atrophy of the abdominal muscles, or one organ may be held in position while another is displaced by an unsuitable support.

Intelligently used, in properly selected cases, mechanical supports are serviceable in the treatment of infants, children, and adults having Glénard's disease or some special form of enteroptosis.

Rest in Bed with the Hips Elevated.—Enteroptotic patients suffer much more when in the sitting and erect posture than when lying flat upon the back in bed. The recumbent posture affords relief because it permits the displaced organs to assume their natural position, arrests the dragging upon their attachments, and also removes the pressure upon adjacent viscera and structures induced by the ptotic organs.

In obtaining a history, I frequently had patients tell me that when they retired they could feel the kidney, stomach, or intestine slip upward, and that this change of position of the organ was followed by an immediate sensation of relief. I have observed marked improvement in many, and a cure in a few cases of abdominal ptosis, follow where the patient was kept upon the back for several weeks with the foot of the bed elevated about 12 inches, to prevent the ptotic organs wandering from their natural position.

I have found it advisable to have patients sleep with the hips elevated, irrespective of whatever measures are being carried out for their relief. As a general rule, this method of retaining ptotic viscera in place is not sufficient to effect a cure, and needs to be reënforced by the other therapeutic measures designed to overcome splanchnoptosis and enteroptosis which have been described elsewhere.

Regulation of the Diet to Increase Nutrition.—Enteroptotic individuals are poorly nourished and deficient in the fatty deposits which should surround and support the organs and viscera. The importance of fat in retaining the intestine in position is observed in colostomy. When establishing an artificial anus I have invariably observed that in emaciated patients, in the absence of adhesions, several inches of the gut could easily be withdrawn from the abdomen; while in fat individuals it is always extremely difficult and sometimes impossible to bring up a sufficient amount of bowel to form the anus, on account of the amount of fat surrounding it and the thickness of the mesentery.

I am sure that fatty deposits shorten the mesentery and fix the bowel, because in one patient upon whom I operated for rectal cancer it was impossible to do more than bring the gut up and open it, which proved unsatisfactory because of the small size of the opening. As a result of the suffering caused by the carcinoma and the annoyance incident to the fecal fistula, the patient lost rapidly in weight and insisted upon another operation. When the abdomen was opened a second time, no difficulty was encountered in withdrawing a sufficient amount of bowel to form a proper spur and make an effective anus, owing to the amount of fat which had been absorbed in the meantime.

It is absolutely essential in most cases of splanchnoptosis and colon ptosis that the amount of fat be increased about the displaced organs before they will remain where they belong.

Under a proper dietary I have frequently seen the manifestations arising from both the general and special forms of enteroptosis gradually disappear, and the wandering of the ptotic organs to diminish or cease altogether.

When the stomach does not rebel, forced feeding, continued for a few weeks, usually increases the bodily tone and the amount of subcutaneous and visceral fat.

In the majority of these cases, in proportion as the patient gains in weight the manifestations caused by the downfall of the viscera disappear. Properly conducted forced feeding, especially when supported by massage, electricity, hydrotherapy, and suitable exercise, not only serves to increase the bodily fat which holds the ptotic organs in place, but also aids in toning up their supporting ligaments, strengthens the abdominal and intestinal musculature, and assists in improving the general condition of the patient.

The diet need not be heavy in the beginning, and may be composed of an abundance of water and a liberal amount of nourishing soups and broths and artificially prepared foods, taken at short intervals. After the first few days, in the absence of gastric disturbances, eggs and other semisolids may be allowed for a short time, and then a regular diet is instituted plus the addition of water, milk, and broths between meals and at night. Anemia, neurasthenia, and other manifestations of intestinal auto-intoxication, obstipation, and local and reflex pains disappear rapidly under forced feeding alone, and still more rapidly when, in addition, the patient is kept in bed with the hips elevated.

Regulation of the Bowels.—The control of the stools constitutes a very important feature of the non-operative treatment of colonic and other forms of ptosis, because in this class of cases the feces have a tendency to collect in large quantities and become impacted, owing to the atonic and atrophic condition of the intestine, and the presence of angulations or twists which obstruct the gut. When the evacuations are dry and nodular, copious water drinking should be encouraged to increase the fluidity of the feces, and 2 or 3 ounces or more of liquid paraffin, neutralol, or olive oil should be administered at night (or twice daily) to lubricate the intestine and soften the evacuations, so as to facilitate their discharge. Fecal accumulations can usually be prevented in the above way or by liberal doses of cascara, licorice powder, one of the bitter waters, or a dinner pill, when the evacuations are infrequent and incomplete, as the result of colonic atony or atrophy.

Once an impaction has formed, castor oil should be given in 1- or 2-ounce doses daily until it has been dislodged, when the oil is discontinued because of its secondary constipating effect.

Chronic impactions located in sagging portions of the gut or above obstructing adhesions, angulations, or twists cannot, as a rule, be brought away with cathartics. Under these circumstances liberal doses of liquid paraffin and frequent copious enemata of oil or soap-suds are in order, to lubricate the bowel and to soften and bring away the impacted masses. Accumulations in the sigmoid and rectum can easily be broken up and washed out through the sigmoidoscope.

Procedures for Strengthening the Abdominal Muscles, Intra-abdominal, and Intestinal Musculature.—In order to improve the condition of enteroptotic subjects and overcome obstipation induced by it, therapeutic measures are indicated, such as deep breathing, massage, mechanical vibration, and electricity, which tend to make the abdominal muscles more powerful, the suspensory ligaments more efficient, and the contractions of the longitudinal and circular fibers of the intestine more frequent and effective.

Systematic deep breathing favorably influences enteroptosis by increasing the capacity of the upper abdomen, making room for the displaced organs, and giving a certain amount of exercise to the transverse colon through the movements of the diaphragm.

Massage may be satisfactorily employed to return ptotic organs to their natural position, to strengthen their suspensory ligaments, and to increase the glandular and muscular activity of the intestine. Experts should alone be permitted to massage enteroptotic patients, because from over-severe treatment or strokes made in the wrong direction no benefit and much harm are to be anticipated. Mild friction-massage and mild vibratory treatments are permissible in this class of cases, while heavy massage and vibration are always contra-indicated.

Mechanical vibration strengthens the abdominal muscles, enhances peristalsis, and in other ways encourages more complete and regular evacuations. When applied to the lower spine, vibration in a roundabout way stimulates the gastro-intestinal tract to functionate with greater activity.

Both massage and vibration may at times be successfully employed in the treatment of enteroptotic patients by breaking up adhesions and straightening out kinks which obstruct the intestine or bind it in unnatural places. Neither massage, vibration, nor electricity should be continued in neurotic individuals when it has been found that these add to their nervousness or interfere with sleep.

Electricity is sometimes used for its tonic effect in the treatment of enteroptosis, but is more frequently employed to lessen neurotic phenomena and to alleviate soreness and pain. The galvanic, sinusoidal, continuous, and Morton induced currents serve to soothe neurotic individuals and lessen their suffering, and the galvanic and faradic interrupted currents to tone up the abdominal muscles and organs as well as the intestinal musculature.

The physiologic effects of massage, vibration, and electricity are not discussed at this time because their action upon the circulation, emunctories, intestine, etc., has been fully described elsewhere.

Hydrotherapy is a valuable adjunct in the treatment of enteroptosis, alone or in conjunction with physical measures and the rest-cure.

Water drinking, rationally handled, helps to increase the frequency of the evacuations by increasing the watery constituent of the feces and exerting a decidedly tonic effect upon the bowel. Cold water (65° to 75° F.) is indicated when the bowel is atonic, and hot water (110° to 120° F.) when the constipated state is due to enterospasm, because the heat soothes the irritable bowel and causes the intestinal muscular fibers to relax.

Water should never be ingested in any case below 50° F. nor above 140° F., because of its injurious effect at such temperatures upon the mucosa.

The indications for enemata in the treatment of fecal impaction due to enteroptosis have already been given. When injections of water are made solely for curative purposes, they should be given small and cold in order to stimulate peristalsis and to produce a tonic effect upon the bowel, and hot and copious when the infrequent evacuations are due to spastic constipation.

Hot-water fomentations, continuously applied to the abdomen, are a valuable aid in the treatment of enteroptotic subjects, both for the purpose of alleviating gas pains and arresting enteric spasms, which interfere with the movements. The general, Scotch liver, and Scotch abdominal douches (Figs. 111, 113, 114), when employed systematically, do much to improve the general condition of these patients and to increase the frequency of the stools. The cold abdominal girdle (Fig. 118), put on at night and worn until morning, has a decidedly tonic effect upon the gastro-intestinal tract and should be substituted for the Scotch douche in aged and delicate individuals.

Stimulation of the Emunctories.—All enteroptotic patients suffer under the effects of intestinal auto-intoxication, hence it is advisable, as far as may be, to prevent toxins from entering the circulation, and when this is too late, to effect their elimination. Both objects are best attained by stimulating the emunctories (lungs, skin, kidneys, liver, and intestine) to a greater activity. Mild exercise in the open air increases the ingestion of oxygen and assists in disposing of poisons, which are excreted through the lungs. The pores may be opened and the skin made to functionate more effectively by means of baths, douches, and massage. The kidneys are made to eliminate toxins more freely by copious water drinking and the administration of certain drugs. Hepatic activity can be markedly increased by direct stimulation applied to the liver by means of massage, mechanical vibration, or the liver or Scotch douche, or by broken doses of calomel. Retained feces and contained toxins can be partially eliminated from the intestine by the energetic administration of powerful cathartics, intestinal antiseptics, water drinking, and intestinal lavage.

Improvement of the General Health.—Individuals who have suffered from abdominal ptosis for a considerable time are nervous, despondent, poor sleepers, and, in fact, mental and physical wrecks. In many instances their condition is rendered more deplorable because they have become convinced that their ailment is incurable. I know of no class of individuals who can be more greatly improved by psychotherapy than those under discussion, more especially when this agent is employed in connection with other measures recommended for the relief and cure of colonic and other forms of enteroptosis.

The quickest way by which nervous phenomena can be minimized or made to disappear is by replacing and retaining the ptotic organs in place and by having the patient *rest in bed* for a few weeks (rest-cure), and take a systematic course of hydrotherapy, massage, vibration, or electric treatment, at the same time that his mind is being treated by suggestion.

Nervous enteroptotic individuals will not or cannot always take the treatment outlined for them, and it is necessary at times to resort to the use of medicines to relieve pain, diminish nervousness, and promote sleep. Drugs must be prescribed cautiously in this class of cases because the condition for which they are given is usually a chronic one, and the patient may contract the drug habit.

When galvanism, friction-massage, or hot applications fail to quiet hysteric individuals, diminish gas pains and soreness, and relieve colic, I proceed to administer the drug which will give the greatest relief and do the least harm.

In the presence of intestinal irritation and enterospasm there are no more reliable drugs than opium or belladonna, alone or in combination.

For the relief of insomnia I know of no more reliable remedies than veronal, sulphonal, trional, chloral hydrate, and the bromids. Headaches which persist in spite of hot and cold applications, friction-massage or galvanism, can, under ordinary circumstances, be relieved by aspirin, bromoseltzer, antikamnia, or by hot-water drinking or gastric lavage when there is irritation of the stomach, or by copious enemata when constipation and fecal impaction are the underlying factors.

When it is desirable to strengthen the general condition of the patient, improve the heart action, and tone up the nervous system, strychnin, arsenic, digitalis, iron, the hypophosphates or nitroglycerin, alone or in combination, give the best results.

Nervous persons suffering from nausea and vomiting, who cannot be relieved by a change of diet, may be made more comfortable by washing out the stomach or by giving them the oxalate of cerium, champagne, cocain, or chloroform-water.

Having discussed the non-operative treatment of splanchnoptosis in a general way, I will now outline the surgical treatment of the individual types of abdominal ptosis, beginning with enteroptosis (intestinal ptosis), as the most important in a work of this kind, and following this with a brief discussion of gastroptosis, hepatoptosis, splenoptosis, and nephroptosis.

CHAPTER XLI

TREATMENT OF SPLANCHNOPTOSIS (ENTEROPTOSIS)

SURGICAL TREATMENT OF INTESTINAL PTOSIS

THE surgical treatment of enteroptosis has not received anything like the attention which it deserves, and which, I believe, will be accorded to it in the future. Naturally, the surgical measures practised for the relief of ptosis of the different parts of the colon require a detailed and complete discussion in a work of this character. It is not my intention to describe in detail the various surgical procedures which have been devised for the relief and cure of gastroptosis, hepatoptosis, splenoptosis, and nephroptosis, because they are somewhat out of my line. I will, however, call attention in a brief manner, to some of the more popular operations which have been invented for their relief, because it occasionally becomes necessary for the specialist on intestinal diseases to replace and fix the stomach, liver, spleen, and kidney while he has the abdomen open to restore and anchor the ptotic bowel.

Operations on the small bowel are rarely necessary, because its displacement is usually due to the colon, kidney, stomach, or other ptotic organ, and it will return to its natural position when the pressure is removed.

Colonic ptosis is more common than is generally believed. I have seen 120 such cases in my own practice in the past decade. In some only a part of the large bowel was displaced, but in others the entire colon had collapsed and was found massed in the lower abdomen. In my series of cases, at one time or another, every part of the colon was found to be ptotic, and sometimes its displacement constituted the entire trouble, but in others there was ptosis of the gut (especially the cecum, transverse colon, and sigmoid flexure), kidney, liver, spleen, and stomach as well.

Enteroptosis is a frequent cause of obstipation, and this type of costiveness would be detected and cured more frequently if internists would keep it more constantly in mind, and if surgeons would take the pains to examine the intestine more carefully when the abdomen is opened for this or other reasons.

I have, by the aid of colopexy and sigmoidopexy, been able to cure a number of men and women who had been treated without success for disease supposedly located in the uterus, tubes, ovaries, bladder, prostate, or urethra. The relief in such cases followed the straightening out of a kink or twist in the ptotic gut.

With the exception of 10 cases reported by Lambotte, in 1892, and 25 by the author (*American Journal of Surgery*, April, 1905), but a few scattered cases have been published where colopexy and sigmoidopexy were resorted to for the relief of colonic ptosis, alone or complicated by invagination. Since the above cases were reported by me, I have operated upon more than treble this number, and, with but two or three exceptions, the results obtained were all that could be desired. The sigmoid I have anchored more frequently than any other part of the colon. When doing a fixation for colonic or sigmoid ptosis, I have made it a practice to anchor the kidney, stomach, or other organ when found to be markedly dislocated, but when slightly displaced I have left them alone and endeavored to correct the deformity by having the patient use a mechanical support, sleep with the foot of the bed elevated, regulate his diet so as to increase the deposit of fat, and resorted to massage and hydrotherapy to strengthen the ligaments, abdominal muscles, and intestine. The non-operative and surgical treatment of gastroptosis, nephroptosis, and splenoptosis will be fully given immediately following the description of the various operations which have been suggested for the relief of intestinal ptosis (enteroptosis). The following are the operative procedures which have been proposed in the treatment of colonic ptosis: (*a*) Colopexy. Author's colopexy with the formation of an extra loop in the descending colon. Author's circular colopexy. Author's colopexy with exclusion. Author's colopexy with invagination. Author's phrenocolopexy with automatic massage. (*b*) Colopexostomy. (*c*) Intestinal exclusion. (*d*) Intestinal resection. (*e*) Mesocoloplication (mesocolopexy-mesopexy).

Colopexy is a term used to describe the operation of fixing a displaced colon to the abdominal wall, but when individual sections of the large bowel, like the cecum, sigmoid flexure, or rectum are anchored in a similar manner, the procedure is designated as cecopexy (typhlopexy), sigmoidopexy, and proctopexy.

Jeannel (1889) and Bryant (1893) performed operations for the relief of complete rectal prolapse which they termed colopexies. These operations, strictly speaking, were not typical colopexies, because on both occasions the bowel, after being anchored, was opened to afford rest to the lower rectum, and colopexostomy would have been a more fitting name for them. Later, however, Bryant closed the artificial opening and anchored the bowel to the abdominal wall, which constituted the first true sigmoidopexy or colopexy.

Lambotte, on October 8, 1895, performed the first colopexy for the relief of colonic ptosis. Gallet, in 1897, did a similar operation, and then Lambotte, in 1902, reported 10 cases of enteroptosis successfully treated by means of colopexy. In 1905 I published a report of 25 cases of obstinate constipation due to ptosis and invagination of the sigmoid into the rectum, which were cured by sigmoidopexy (colopexy). One of these operations was performed in 1896, 2 in 1897, and the others in succeeding years, up to the time of their publication (*Amer. Jour. oj Surg.*, April, 1905).

Altogether, I have performed colopexy (including cecopexy and sigmoidopexy) for the relief of colonic ptosis, alone or complicated by invagination, 75 times, and the results have been very satisfactory. My experience with this operation has convinced me that persons suffering from obstipation and other troublesome manifestations of enteroptosis, who fail to obtain relief from non-surgical measures, can in many instances be permanently cured by this procedure.

I do not regard colopexy as a dangerous operation, because in my series of cases I have had but 1 death, and this was probably due to appendicostomy which was done at the same time for the relief of colitis. This patient died from peritonitis after I had sailed for Europe, and I have been told that the infection was carried to the abdomen by means of a probe in the hands of my house surgeon while endeavoring to locate the appendiceal opening for purposes of irrigation.

In a few of my cases the colon was enormously dilated and it was infolded before being suspended, but in most instances the bowel was smaller than normal, very pale and thin, and the longitudinal bands were poorly developed and difficult to make out. At times, owing to its small size and massing in the lower abdomen, it was hard to distinguish the large from the small intestine. On a few occasions the gut was hard and presented a narrow or tube-like appearance, while at other times the cyanosis and edema mentioned by Lambotte was observed. The impairment of the circulation, the obstipation, and consequent auto-intoxication were due in most instances to an obstruction of the mesenteric vessels and the intestine, caused by twists and kinks in the gut and its mesentery. The mesentery, as a rule, was long, thin, transparent, and contained little or no fat. Except when the ptotic bowel was bound down by adhesions, no difficulty was encountered in bringing the gut upward and into position to be anchored; in fact, the difficulty met with in most cases was to determine how to deal with the excessive amount of bowel presented and prevent it from becoming again angulated or twisted.

Colopexy is suitable alike for the young and the old, but the operation should not be performed during infancy and childhood except in deplorable cases of enteroptosis which are unamenable to other methods, because these little patients do not tolerate abdominal operations as well as adults.

Patients whose colon has been suspended sometimes complain of gas pains while on a fluid diet, or of enterospasm, but the discomfort from this source usually disappears after an evacuation has been secured and they are permitted to take solid food; later on, they occasionally experience a pulling sensation in the side when up and about, but this gradually subsides. Sometimes obstipation, headache, and the nervous phenomena induced by enteroptosis and the associated auto-intoxication disappear shortly after the operation, but in other cases it is necessary to institute a postoperative course of hydrotherapy, massage, vibration, or electricity in order to hasten their departure.

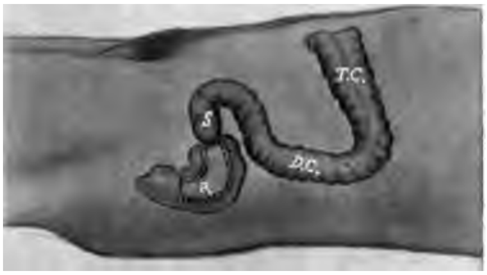


Fig. 205.—Showing invagination of sigmoid flexure into the rectum.

Patients upon whom I have performed colopexy are usually required to remain in bed for two or three weeks, in order to insure a firm union between the bowel and the abdominal wall.

Technic of Simple Colopexy and Sigmoidopexy.—The steps in this procedure are very simple, and the operation should not require more than twenty minutes, except when unlooked for complications are encountered. The preparation of the patient is the same as for other abdominal operations. When the sigmoid is to be suspended, I usually make a 2-inch incision in the median line midway between the pubes and the umbilicus or through the left rectus muscle on the same level

(Fig. 206); but when the entire colon has collapsed and requires fixation at a number of points, I employ a 4-inch median incision which extends 2 inches above and 2 below the umbilicus and passes it to the left, which enables me to reach and anchor all parts of the large bowel.

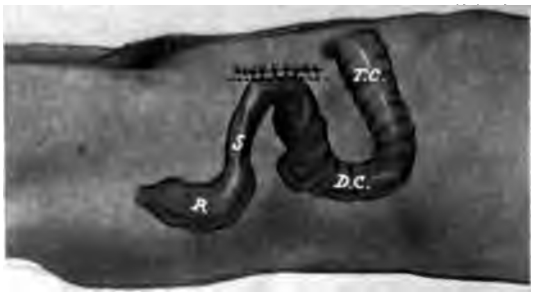


Fig. 206.—Showing invaginated bowel withdrawn from the rectum and anchored to the abdominal wall.

When the abdomen has been opened, the peritoneum on either side of the cut is clamped for identification, the finger or the hand, if necessary, is introduced into the cavity and a careful examination made of the liver, kidney, stomach, spleen, and the various segments of the colon to determine if ptotic, and if so, to what extent.

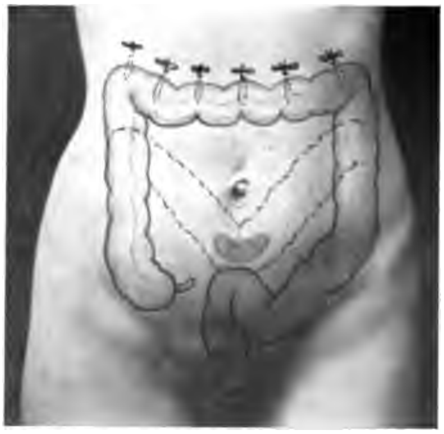


Fig. 207.—Dotted lines show extensive V-shaped ptosis of the transverse colon; the shaded area shows the point where the feces collect in it, and the stitches show the manner of anchoring it to the abdominal wall.

Adhesions which bind the ptotic organs to adjacent structures or cause angulation or twisting of the bowel are destroyed by rolling the gut between the fingers, wiping it with a gauze sponge, or, when the adhesions are firm, by dividing them with knife or scissors. After bleeding has been arrested by the application of hot compresses, adrenalin, powdered iron, or the ligature, rents in the intestine are closed by Lembert sutures and other raw surfaces are covered with peritoneum. Other organs found to be markedly displaced are restored and fixed by one of the procedures described further on, but when ptotic to but a slight degree, they are left alone to be treated later by mechanical supports and other measures elsewhere recommended for replacing and maintaining them in their normal position. The bowel, which has already been freed, is then brought outside the abdomen and inspected to determine the degree of the ptosis and the most satisfactory points of fixation. It is easy to determine where and how to anchor the cecum, the transverse colon, or the sigmoid flexure when ptotic, but it is an exceedingly difficult problem to decide how to group the suspending sutures and avoid sagging, angulation, or twisting of the gut when the entire colon has collapsed (Figs. 59, 207) and requires the formation of new flexures, with anchoring at several other points.

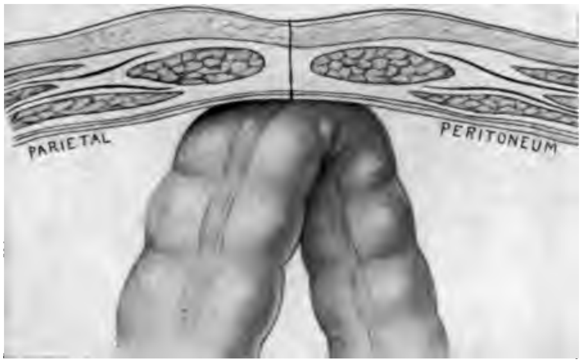


Fig. 208.—Showing peritoneal surface of the gut brought in contact with the parietal peritoneum.

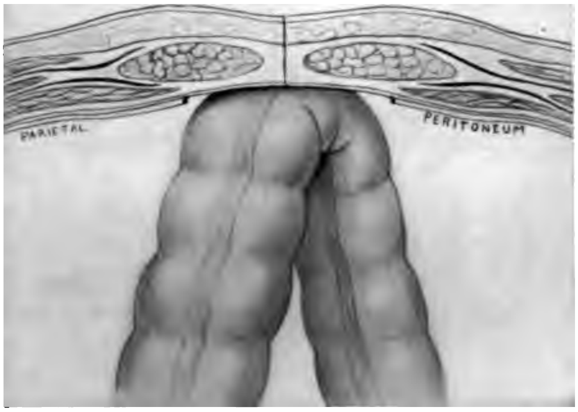


Fig. 209.—Showing peritoneal surface of the gut brought in contact with the transversalis fascia.

I believe that the normally sharp flexures (Fig. 58) of the large bowel are a frequent cause of obstipation, and in order to prevent obstruction from this source after the gut has been restored, I make oval turns at the usual sites of the flexures. This is done by using two groups of sutures instead of one at the corners which are anchored at the lower margin of the ribs, and by lifting up and anchoring the transverse colon in such a way that it takes a semicircular rather than a straight course across the abdomen.

Placing of the suspensory sutures is easy for the surgeon experienced in this work, but is confusing and difficult for the novice. The manner of placing the stitches differs, depending upon whether or not the peritoneal surface of the bowel is brought directly in contact with the parietal peritoneum (Fig. 208) or with the transversalis fascia (Fig. 209), after it has been denuded of its serosa. When the two peritoneal surfaces are joined, the bowel may be suspended with the same chromicized catgut sutures used to close the inner layers of the wound (Fig. 210), but when the bowel is brought up against the transversalis fascia, I prefer to anchor it with through-and-through sutures of Pagenstecher's

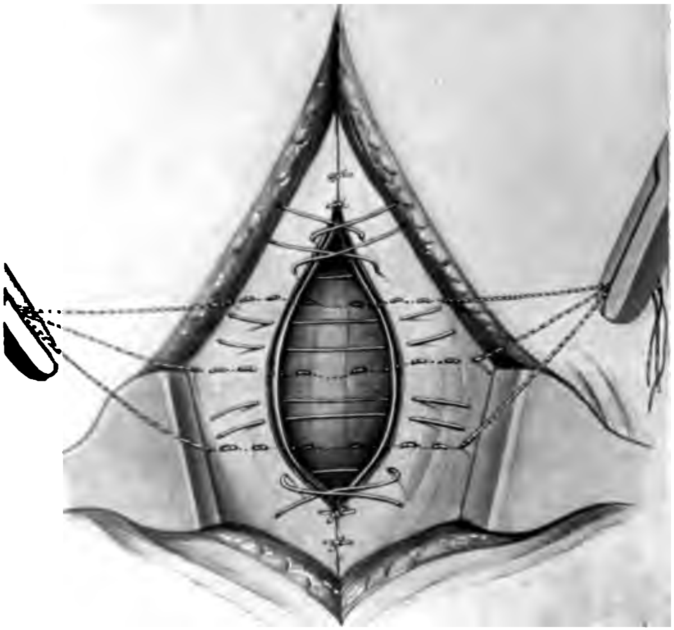


Fig. 210.—Showing method of placing the suspensory and other sutures when the gut is brought into contact with the parietal peritoneum.

linen or silk (Figs. 210–212); the latter method is preferable because it gives a firmer union. On one or two occasions I have known relapses to occur following the union of the peritoneal surfaces of the intestine and the abdominal wall. In these cases the weight of the bowel upon the peritoneum causes it to stretch out in the form of a ligament, which in turn permits the bowel to drop downward and again cause obstruction by becoming angulated or twisted.

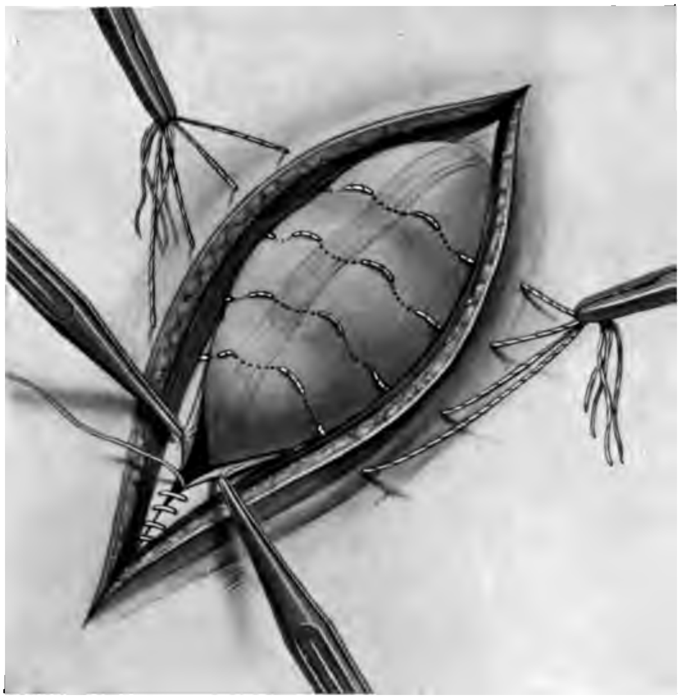


Fig. 211.—Showing method of introducing the through-and-through sutures which hold the colon in contact with the transversalis fascia and the running stitch used to close the deep fascia.

The intestinal sutures may be introduced with a cambric or, preferably, a small-sized, flat, straight, or curved surgeon's needle, but when they are to be carried through the entire thickness of the abdominal wall, a long-handled, a Hagedorn, or other large needle is required. When the fixation is to be made at a considerable distance from the incision, I use a Zweifeld (Fig. 213), Peasely, or other strong long-handled needle which is curved at the end and has a cutting edge. With the aid of such an instrument, fixations of all parts of the colon can be accomplished through one incision (Figs. 206, 214). After the bowel has been scarified at the points of fixation, three or four sutures are placed upon the anterior surface of the gut, transversely to its long axis and ½ inch apart, each thread is made to take three bites (Figs. 210, 211) into the musculature, the middle one passing beneath the anterior longitudinal band, the ends being left long and clamped for identification. When all of the suspensory sutures have been introduced into the intestine, the ends of each stitch are in turn threaded into the long-handled needle and pushed through the abdominal wall (Fig. 213), where they are again clamped to prevent slipping (Figs. 210, 211). When the different groups of stitches have been brought outside, they are first made taut, and then the ends are separated and tied over gauze pledgets or pieces of rubber tubing to prevent cutting the skin (Fig. 217). Where the entire colon has collapsed, the sutures supporting the cecum are first tied, and then those which are to suspend the hepatic flexures, transverse colon, splenic, and sigmoid flexures

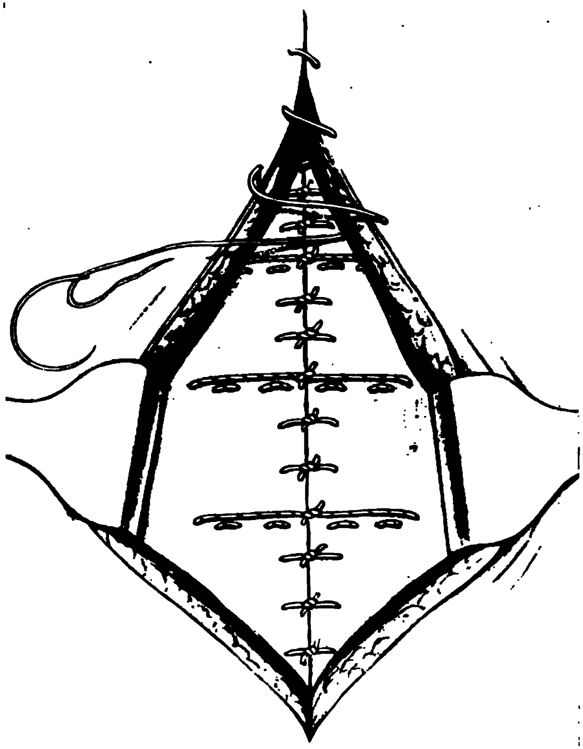


Fig. 212.—Showing appearance of suspensory and other sutures after the fascia has been brought together, and a method of closing the skin in colopexy when the two peritoneal surfaces are approximated.

are each in their turn made fast, care being taken meanwhile to see that no part of the colon is left sagging, angulated, or twisted.

The three broad bites taken serve to bring the whole of the anterior surface of the gut into contact with the peritoneum or the denuded parietes, which insures a firm union and obviates the danger of the stitches cutting out, as has been known to occur where but one bite was taken.

When the anchoring process has been completed, the incision is closed (Fig. 214), the dressings are applied, and the patient is placed in a bed the foot of which has been elevated some 10 or 12 inches.

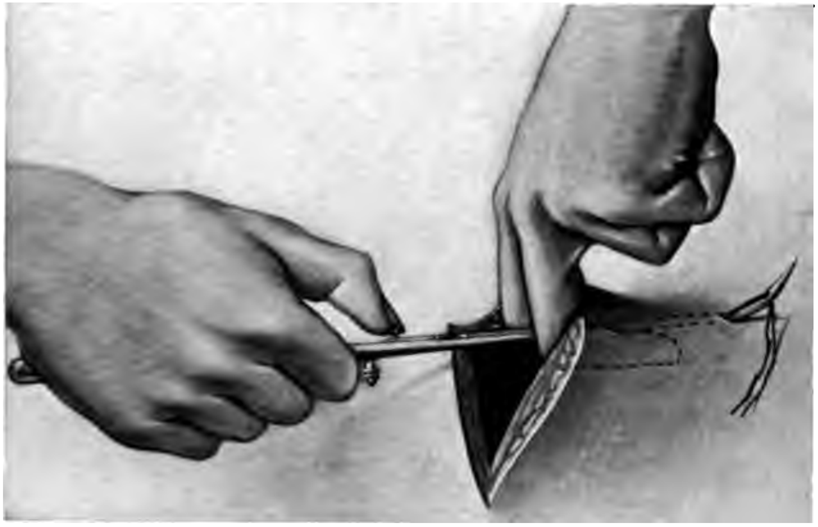


Fig. 213.—Method of introducing the suspension sutures at a considerable distance from the incision by means of a strong long-handled needle.

Following colopexy the patient is kept upon fluids until after the bowels have been moved on the third day, when he is permitted to partake of a limited amount of solid food, and after the expiration of one week he is put upon a regular diet plus the addition of broths and rich milk between meals and at night.

Ordinarily, the bowel moves regularly and of its own accord immediately after the operation, but when it fails to do so, the coveted daily stool can be secured by water drinking and massage, or, if necessary, by the administration of Carabana water in small doses or a mild dinner pill mentioned in the Formulary. When the evacuations are dry and tend to become clogged, olive oil or liquid paraffin in liberal doses are useful to soften the feces and lubricate the intestine. When fecal impaction occurs, in spite of this treatment, it should be corrected by the administration of castor oil or copious high enemata.

Gas pains are usually arrested by means of friction-massage, galvanism, or hot fomentations applied to the abdomen; but when these remedies fail, opium and belladonna, alone or in combination, should be prescribed to stop the pain and allay intestinal irritation. It is my custom to have this class of patients wear an abdominal support and take good care of themselves for a few weeks following the operation, in order to afford the intestine and other ptotic organs an opportunity to become firmly fixed in their natural position.

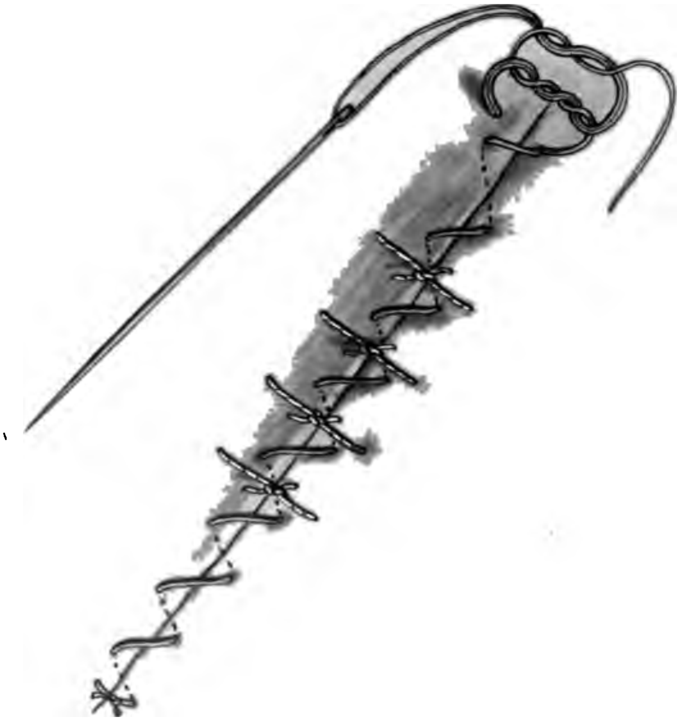


Fig. 214.—Showing skin and supporting sutures tied *in situ*.

Author's Colopexy with the Formation of an Extra Loop in the Descending Colon.—When the bowel or its mesentery is very long, and from 15 to 20 inches can be withdrawn through the incision, simple colopexy will not prove satisfactory because the gut is so long that it will sag or become angulated or twisted when anchored at one or several places. In order to overcome these difficulties, I have on several occasions succeeded in taking up the extra slack by bending the descending colon and mesentery upon themselves and forming an extra loop by joining the two segments of gut with sutures, placed after the manner shown in the accompanying illustrations (Figs. 215–217). The newly formed loop is then anchored to the abdominal wall after the manner already described. The essential point in this operation is to place the sutures in such a way that they will not constrict the mesenteric vessels *nor cause a sharp angulation* at the outer end of the loop (Figs. 216, 217). The results which have followed this operation (6 cases) have been very satisfactory.

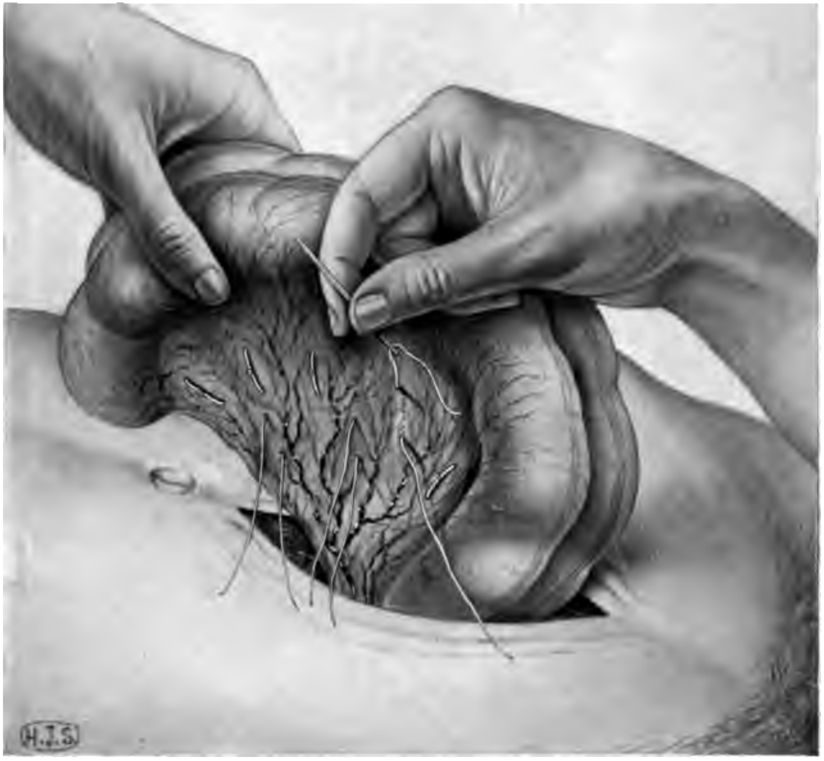
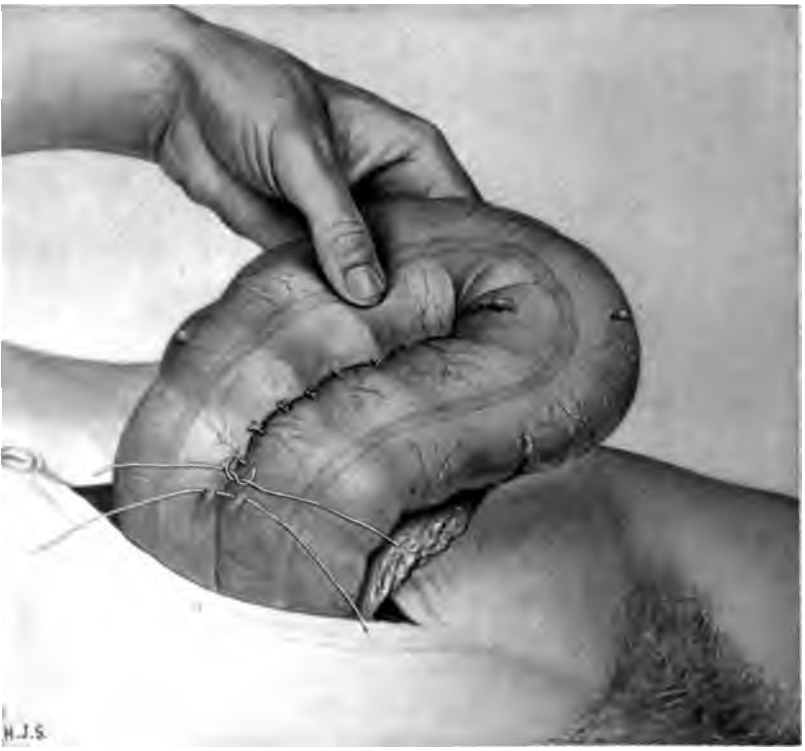


Fig. 215.—Showing mesenteric sutures placed parallel with the vessels, in author's colopexy, with the formation of an extra loop in the descending colon.

Author's Colopexy, where the Bowel is Suspended Above the Rectus Muscle.—I have succeeded in relieving 3 patients who suffered greatly from ptosis of the left half of the colon by suspending it above the left rectus muscle (Fig. 218, 1, 3, 5).

The technic of this procedure consists in opening the anterior sheath and dividing the muscle and posterior sheath after the latter has been split. An opening is then made in the mesentery at its juncture with the bowel, care being taken to avoid injury to its vessels. The divided muscle and tongue like piece of the posterior sheath are now pushed through the rent and sutured (Fig. 217, 1, 2). The stitches in the muscle and sheath are placed at some distance from the cut ends (Fig. 217, 1, 2) to prevent cutting out. Finally, after the structures about



[illegible] sutures in joining the legs of the loop together, in [illegible] formation of an extra loop in the descending colon.

the bowel are snugly joined around it by single sutures (Fig. 218, 3), the anterior sheath and skin are approximated (Fig. 217, 4), using a continuous intercutaneous catgut suture for the latter.

Author's Circular Colopexy. Another way which I have found effective in overcoming colonic ptosis due to an elongated sigmoid is to anchor it to the abdomen in a *circular* fashion (Fig. 219) by placing the first group of sutures at the beginning of the sigmoid, the second in the median line at or above the umbilicus, the third midway between this point and the right anterior spine of the ileum, and the fourth in the median line slightly above the pubes. The size of the circle is made

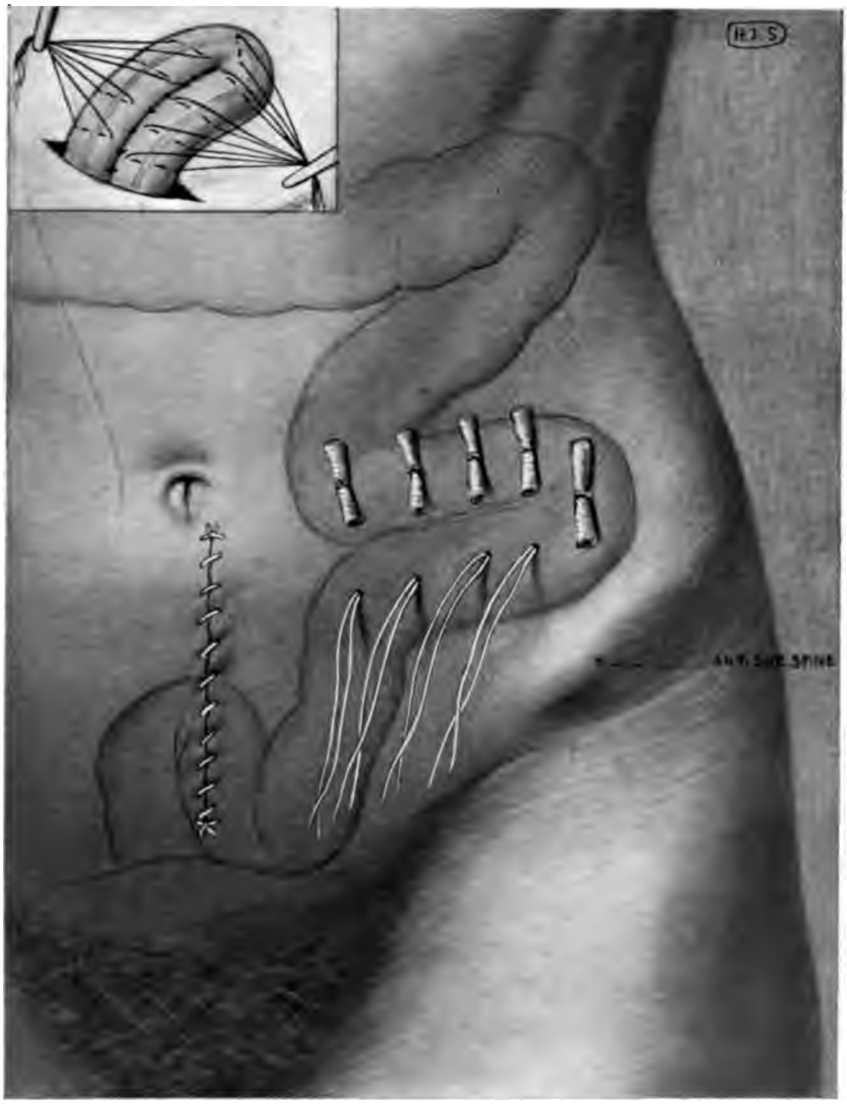


Fig. 217.—Showing progressive steps in author's colopexy, with the formation of an extra loop in the descending colon.

larger or smaller, according to the extent of the ptosis and the amount of bowel to be disposed of.

One who is not familiar with the operation of colopexy would naturally believe that fixing the bowel to the anterior abdominal wall in the

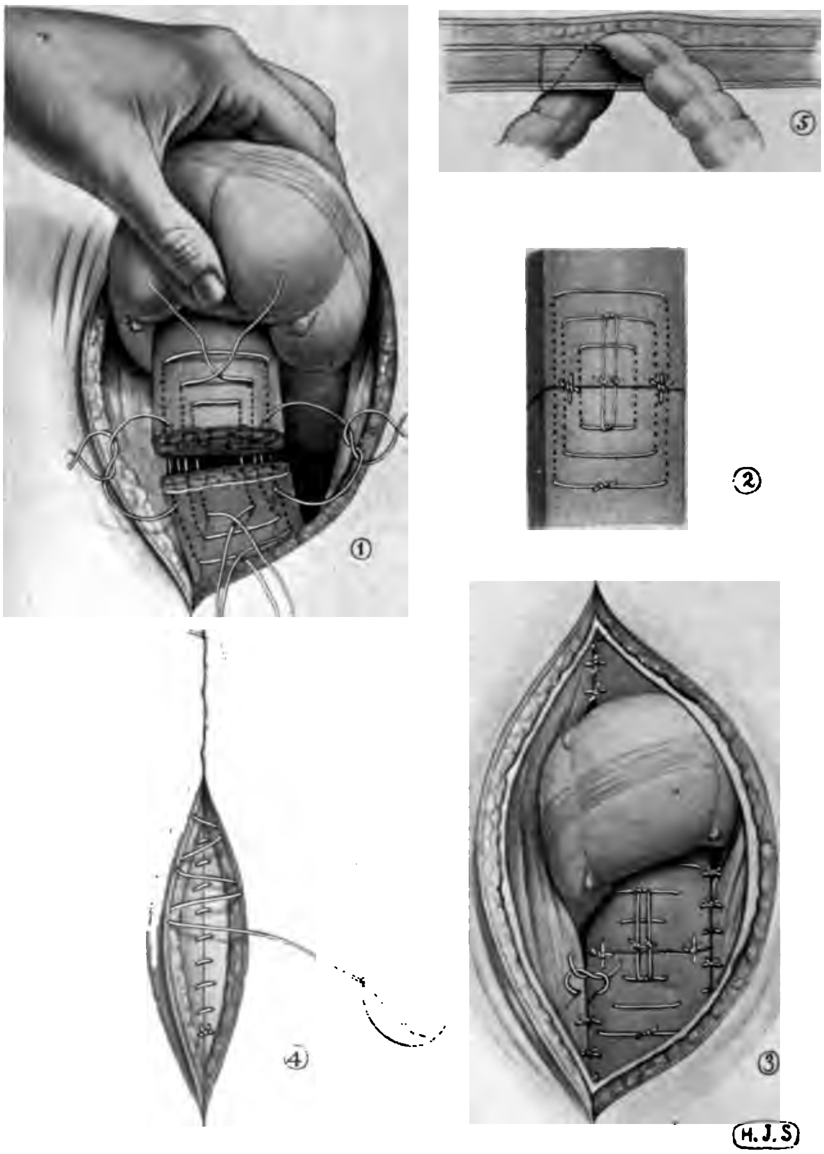


Fig. 218.—Showing progressive steps in author's colopexy, where the bowel is suspended above the rectus muscle: No. 1 shows the muscle pushed through the mesentery of the bowel, and sutures in place, ready to be tied; No. 2 shows appearance of the stitches after they have been made fast. No. 3 gives a bird's eye view of the wound after the posterior sheath has been folded to the muscle about the bowel. No. 4 shows approximation of the anterior sheath and partial closure of the integument by an intercutaneous suture; No. 5 gives an idea of how the sigmoid passes upward and over the rectus and downward to the pelvis, when the operation has been completed.

ways described would interfere with the fecal current, but surgeons familiar with this procedure know that, on the contrary, it greatly facilitates the evacuations.

On a few occasions I have stitched the bowel to the lateral and posterior walls of the abdomen to straighten out twists and kinks and to overcome ptosis, but have not found this method desirable because it was more difficult and less satisfactory than when the colon was anchored to the anterior abdominal parietes.

The technic of cecopexy and sigmoidopexy for enteroptosis, alone or complicated by invagination, is similar in every way to that of colopexy, and because of this I will not give them separate attention. Colopexy can be quickly and easily performed under favorable circumstances, but when the entire colon has collapsed, is pressed upon by other organs, or thrown into angulations or twists, or bound down by numerous strong adhesions, considerable ingenuity and patience are required to bring the operation to a successful issue without doing serious injury to the bowel or adjacent organs. I have found it advisable on a few occasions to discontinue my efforts at fixation because of the difficulties encountered, and to resort to colopexostomy, intestinal exclusion, or resection, in order to relieve the patient of persistent obstipation and other distressing manifestations.

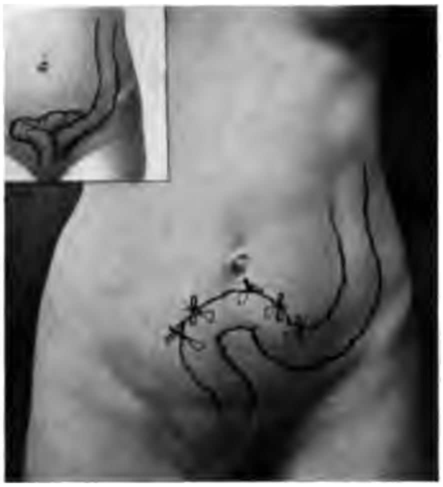


Fig. 219.—Circular colopexy for ptosis of the sigmoid flexure is shown in the small drawing, and its replacement and fixation in the larger one.

Author's Colopexy with Exclusion.—On a few occasions, where the colon was of unusual length and collapsed to such an extent as to render fixation to the abdominal wall impossible without leaving sagging parts to collect the feces and continue the obstipation, I have resorted to the following procedure: After the colon had been anchored at one point, to prevent it from dropping downward and pressing upon the intestine elsewhere, or interfere with other organs, I have excluded the suspended portion by making an anastomosis between the most dependent points of the drooping bowel on either side of its fixed point, so that the fecal current can pass directly from the segment above into that below, without the necessity of passing through the segment of gut anchored to the abdominal wall. If the excess of gut is very great, the intestine may be anchored at two places 3 inches apart, and then the innermost borders of the two suspended loops approximated the one to the other at a point below the swinging segment of bowel between them. These procedures are particularly suited to the treatment of patients who suffer from aggravated colonic ptosis complicated by dilatation.

Author's Colopexy with Invagination.—Still another procedure which I have resorted to in order to take care of excessive or sagging portions of the bowel after fixing it to the abdominal wall to prevent it from wandering, is as follows: After having scarified the peritoneum at as many points as may be required, the upper part of the drooping segment is pushed into the lower and fastened there by a continuous Lembert seromuscular suture, which approximates the serosa of the invaginans and the invaginatum, and retains them in this position until they have become agglutinated. This procedure has served its purpose very well in the 2 cases in which it was adopted. From my observation in these 2 cases, and my experience in the treatment of patients suffering from ileocecal invagination, or invagination of the sigmoid flexure, I am inclined to the belief that dangerous or troublesome complications need not be anticipated because of the invagination of the gut in the above manner.

Phrenocolopexy, with Automatic Massage.—At different times, when operating upon enteroptotic patients, I have suddenly come upon the diaphragm and have studied with much interest the character of its movements. That it must stimulate peristalsis, up to a certain degree, through its influence upon the large bowel, I feel convinced of, and, in fact, have been tempted on more than one occasion to anchor the colon, when ptotic to a moderate degree, to the diaphragm (phrenocolopexy), in order that the bowel might be prevented from wandering and at the same time receive automatic massage, but have refrained from doing so because of the unpleasant disturbances which might ensue through the effect upon the respiratory and cardiac functions.

Colopexostomy.—Occasionally, ptosis of the colon or sigmoid is complicated by a growth, intestinal catarrh, or specific ulceration, also by invagination or complete rectal prolapse, which keep the patient in a most deplorable condition. Under such circumstances colopexy alone will prove unsatisfactory, because it does nothing to heal the mucosa and is often followed by a relapse of the invagination or prolapse, owing to the relaxation of the tissues and the straining incident to defecation. In view of these conditions, colopexostomy or resection, combined with appendicostomy or cecostomy, should be performed in order that the growth or ptotic segment of gut may be removed and the bowel be given a rest as well as the benefit of medicated irrigation.

In performing colopexostomy the abdomen is opened through the left rectus muscle on a level with the usual colostomy incision. I then hook up the sigmoid and draw it from above until taut, and from below until all the slack is taken out, and then anchor it as in colopexy to the abdominal wall just above and below the angles of the incision. Finally, the operation is completed by stitching the inner surfaces of the projecting loop together and then uniting it to the skin all around with plain gut. Except when dangerous symptoms arise on account of distention, the intestine is not amputated for several days, in order to minimize the danger of fecal infection of the wound. When the catarrhal condition or ulcerative process has subsided, the artificial anus may be closed by end-to-end sutures or lateral anastomosis.

Patients sometimes object to colopexostomy because the feces are voided through an unnatural channel, but such objections on their part should be overruled because they have incontinence already due to the prolapse, they cannot go through life with a segment of bowel constantly dangling between their legs, and the good results which follow the operation more than offset its single obnoxious feature.

Intestinal Exclusion.—When the colon is ptotic and enormously dilated or angulated, twisted and bound down by adhesions, rendering it unfit for fixation, exclusion of all or part of the colon yields remarkably good results. Intestinal exclusion should supersede both colostomy and colopexostomy in this class of cases because it affords the desired relief and the patient is not annoyed by an artificial anus. Under such circumstances, I have obtained good results by dividing the ileum 6 inches from the cecum, inverting and closing both ends by purse-string sutures (Figs. 174–177), and then making an anastomosis between the proximal end of the ileum and the lower sigmoid or upper rectum (Figs. 175, 176, 179). When the ptotic condition of the bowel is complicated by simple catarrh or ulcerative colitis, provision for through-

and-through irrigation is made by performing appendicostomy or cecostomy.

Where the cecum and ascending colon are down and fixation is impracticable, the ileum may be joined to the transverse or descending colon or lower down; but when the transverse colon, splenic flexure, descending colon, and sigmoid flexure are involved and incapacitated, ileorectostomy (proctostomy) is indicated.

Evacuations are more regular after partial colonic exclusion, and are very soft and frequent immediately following complete exclusion, but as time passes the ileum takes upon itself the work of the colon, and the movements gradually diminish in frequency for a few weeks, when they become normal again in number and consistency.

The technic of intestinal exclusion has been given elsewhere and need not be repeated here.

Resection.—Removal of a part or all of the colon is justifiable in the treatment of enteroptosis when the bowel is the seat of malignant disease, is very long, dilated, or would sag, become angulated or twisted, or be pressed upon by other organs, in spite of being anchored at one or more points. Resection is indicated in ptotic patients where the bowel is displaced and extensively ulcerated, is blocked by benign or malignant growths, or permanently incapacitated by the presence of kinks, twists, adhesions, or other pathologic conditions. In such deplorable cases the gut should be severed above and below the useless segment, and the healthy ends be united by end-to-end or lateral anastomosis, after the diseased portion has been removed.

When the entire colon is permanently incapacitated, it is advisable to resect it and anastomose the ileum with the rectum or lower sigmoid. Lane has excised all or part of the colon for the relief of obstipation and auto-intoxication 39 times, with 4 deaths, and the results obtained were very satisfactory. It makes very little difference whether 10 or 20 inches of the colon are removed, in so far as the mortality and the usefulness of the bowel are concerned.

Resection of the small intestine is rarely indicated in enteroptotic patients, because the displacement of the gut is caused by the pressure of other ptotic organs and will be relieved when these are replaced and fastened in their normal position.

Mesocoloplication (Mesocolopexy).—Folding the mesocolon and the mesentery of the small intestine have been resorted to a number of times in the past to limit the mobility of the bowel and prevent recurrence following operations for the relief of invagination; but until recent years this procedure has not been employed in the treatment of intestinal ptosis.

Mesocolopexy has been performed successfully once by Bier, once by Hirschmann (*Meeting of American Proctologic Society*, 1908), and 6 times by the author. In my series of cases the operation was performed for the relief of colonic or sigmoidal ptosis alone or complicated with invagination of the sigmoid flexure into the rectum, and with complete prolapse of the rectum in 2 instances; in 1 case I was enabled to overcome the displacement and prolapse, and relieve my patient by mesosigmoidopexy; in another this procedure failed, and I was compelled later to do an anterior fixation of the colon. In my more recent cases I have done a combined operation, which consisted in first shortening the mesocolon by plication (Fig. 215) and then anchoring the colon or the sigmoid to the abdominal wall, which had been previously denuded of its peritoneum.

The good results obtained by surgeons in preventing the recurrence of invagination of the bowel by plicating the mesentery and shortening the lesser omentum with the gastrohepatic and gastrosplenic ligaments in gastroptosis, caused more recent operators to attempt the cure of intestinal ptosis by shortening the mesocolon. The technic is similar to that employed for shortening the ligaments of the liver, spleen, and stomach, which will be described further on. In doing this operation it is of the utmost importance to see that the stitches are placed parallel with the vessels (Fig. 215), because when these are crossed by the stitches the patient will suffer from postoperative meteorism or sloughing through impairment of the circulation. Care is likewise needed so as not to injure the veins, else a hematoma will form or great difficulty will be encountered in the control of hemorrhage.

Mesosigmoidopexy was performed by Bier for the purpose of overcoming colonic ptosis, and Hirschmann operated to afford his patient relief from rectal procidentia (third degree). In his operation he scarified the outer surface of the mesentery of the large sigmoidal loop and then sutured the opposing surfaces in three rows 1 inch apart with No. 2 twenty-day catgut. This caused a lifting upward of the sigmoid and prolapsed rectum as the stitches were tied. He also infolded the anterior surface of the sigmoid, a procedure which, in so far as I can see, requires an additional amount of time, but adds nothing toward preventing the downward displacement of the bowel. My experience with mesocolopexy warrants me in believing that this operation will not prove effective in the majority of instances when used alone, but that it is an aid in the treatment of enteroptosis and invagination when combined with sigmoidopexy.

Treatment of Rectal Prolapse.—Simple prolapse of the mucous membrane or, for that matter, of all the rectal coats (Fig. 220) rarely induces constipation, but when colonic ptosis is complicated by invagination of the sigmoid and extensive prolapse of the rectum, the patient invariably suffers from obstipation. In aggravated cases palliative and operative measures are of little service, but a cure can be effected by operative procedures. I know of but few conditions which are more difficult to correct than the one under discussion; hence, neither surgeon nor patient should become discouraged because a second or even a third operation is required for a perfect cure. Linear cauterization, which is effective in the treatment of simple prolapse in children, is utterly useless in this class of cases.

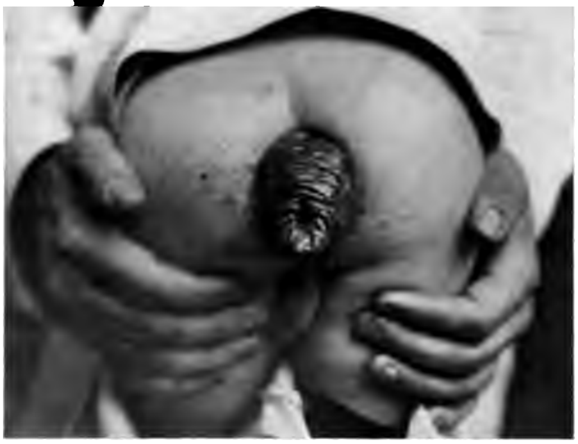


Fig. 220.—Complete rectal procidentia (author's case).

Colopexy and sigmoidopexy will bring about a cure when the invagination and prolapse are not extensive, but when the intestine or its mesentery is exceedingly long or its attachments have given way, the sigmoid becomes invaginated, and the rectum protrudes for several inches beyond the anus, resection, colopexostomy, or the author's combined operation should be resorted to in order to effect a permanent cure.

Author's Combined Cauterization, Proctoplasty, and Sigmoidopexy.—This operation has for its object abdominal fixation of the bowel, the setting up of an inflammatory reaction which will cause the rectal coats to become adherent to each other, narrowing of the rectum, and shortening of the sphincter muscle. The procedure is easy to carry out and is practically devoid of danger.

The *first step* in the operation consists in doing a sigmoidopexy after the plan described elsewhere; the *second*, in thoroughly cauterizing the lower sigmoid and upper rectum through a proctoscope or by the aid of an operating speculum; the *third*, in removing a diamond-shaped piece of flesh which includes a strip of bowel, a section of the sphincter 1 inch in width, the skin and subcutaneous tissues backward almost to the coccyx; the *fourth*, in providing drainage and closing the wound with chromicized gut, and the *fifth*, in applying the dressing.

I have performed this operation a number of times (10) and have had but one relapse.

Excision of the prolapsed piece of gut is not a satisfactory operation because it is difficult and dangerous, requires considerable time, is accompanied by profuse bleeding, does not prevent the slipping downward of the segment of bowel immediately above that removed, and is often followed by undesirable sequelæ. Recurrence is more frequent after excision than after the combined operation just described.

Fowler and Tuttle recommend fixation of the rectum by stitching it in the hollow of the sacrum (rectopexy, proctopexy), by bringing the sutures out and tying them across the bone. I have not found this method effective in aggravated cases, and have attributed the poor results obtained to the fact that only the posterior portion of the bowel is tucked up.

I have elsewhere[1] described several other operations devised for the cure of simple prolapse of the rectum, which I will not discuss here because they are usless in so far as the treatment of constipation is concerned.

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[1] Gant, *Diseases of the Rectum and Anus*, third edition, 1906.

CHAPTER XLII

TREATMENT OF SPLANCHNOPTOSIS—ENTEROPTOSIS
(*Continued*)

Gastroptosis. Hepatoptosis. Splenoptosis. Nephroptosis.

TREATMENT OF GASTROPTOSIS

THE treatment of this condition may be *symptomatic* or *surgical.* When the former plan is adopted, we must necessarily rely mainly upon regulating the diet, having the patient sleep with the foot of the bed elevated, and wear a mechanical support while in the erect or standing posture, with the use of massage, mechanical, vibratory, or electric treatment to strengthen the abdominal muscles and ligaments; but when a surgical procedure is decided upon, one of the operations about to be described should be selected.

Gastropexy.—Several ways of suspending and keeping the stomach in place have been suggested by different operators, the most useful of which I will briefly describe.

Fixation of the stomach is always difficult when the thorax is abnormally small, the liver ptotic or adherent, and when the organ is bound down by firm adhesions. Ordinarily, the results of gastropexy are very good, and this operation should be performed more frequently for the relief of gastroptosis than is the case at the present writing. Lambotte (*Jour. de Chir. et Ann. d. l. Soc. Belge de Chir.*, October, 1904) maintains that this condition is nearly always complicated by *gastrectasis* and *pyloric stenosis*, and recommends the routine performance of pylorectomy, duplication of the anterior wall of the stomach, and gastropexy in this class of cases.

Rovsing's Gastropexy (Volkmann's *Sammlung Klin. Vortrage*, 431, August, 1906).—This operator, after scarifying the stomach, fixes it to the anterior parietes with three horizontal seromuscular sutures of strong silk. Each is made to take three bites in the stomach, and the sutures are placed the one above the other, the first just below the lesser curvature, the second, 1 inch lower, and the third, a little more than 1 inch below the second, the ends of the stitches are left long and pass through the abdominal wall on either side of the incision, where they are tied across a gauze-covered glass plate to prevent them from puckering the skin, so that a considerable area of the scarified stomach is brought in contact with the parietal peritoneum. The sutures are removed at the end of three or four weeks.

The operation proved effective in a large series of cases operated upon by Rovsing and his assistants.

Duret's Gastropexy (*Rev. de Chir.*, p. 430, 1896).—Duret exposes the peritoneum through a median incision extending from the xiphoid cartilage to the umbilicus, incises the lower two-thirds, and leaves the upper third of the parietal serosa intact. The stomach is then located, scarified, and anchored to the undivided peritoneum by a continuous silk suture, which passes through the abdominal wall on the left and is then made to take a broad bite, first in the peritoneum and then in the stomach, and so on until three successive bites have been taken in the serosa and the stomach, when the suture is brought out through the abdominal wall on the right. This suture is placed just below the lesser curvature, and when tied brings a broad surface of the stomach into apposition with the projecting peritoneum.

Beyea's Operation.—To Beyea (*Phila. Med. Jour.*, p. 257, 1903) belongs the credit of devising the most simple and effective operation yet suggested for the cure of gastroptosis. His procedure restores and leaves the stomach in its normal position, and does this in such a manner that the operation is rarely followed by gastric disturbances. He makes a 3-inch median incision between the xiphoid cartilage and the umbilicus, and then locates and puts on the stretch the gastrohepatic and gastrosplenic ligaments, after they have been previously dissected free from adjacent structures. Working from right to left, the ligaments are shortened by a series of three plications formed by the introduction of five silk mattress sutures. This method of anchoring effectively restores and retains the stomach. Bier, after shortening the gastrohepatic and gastrosplenic ligaments, introduces additional sutures, which anchor the pyloric end of the stomach to the capsule of the liver and the lesser curvature to the left lobe.

I have succeeded in permanently relieving 2 exaggerated cases by Beyea's operation. My experience with this procedure has convinced me that it is more reliable than the operations of Coffey or Davis, the former of which consists in fixing the stomach to the abdominal wall 1 inch above the umbilicus with chromicized catgut sutures, and the latter, in anchoring its attached omentum to the parietal peritoneum.

Blecher (*Deutsch. Zeitschrift f. Chir.*, vol. lvi., 1901) cites 4 cases of gastroptosis treated by Bier, wherein the ptotic condition of the stomach was overcome by gathering and stitching the gastrohepatic ligament into folds. He considers the method of Bier superior to those of Duret and Rovsing because it interferes less with the physiologic movements of the stomach. Three or four sutures are introduced directly under the liver through the ligament and brought out about 1 centimeter below; other bites are then taken in the middle of the ligament and just above the lesser curvature; the threads, when tied, gather the ligaments into folds and at the same time lift the stomach upward. The first stitch is placed beside the hepaticoduodenal ligament and includes the serosa and muscularis of the pyloric region and the capsule of the liver, while the others follow in the direction toward the cardia.

In 2 cases, in order to give the stomach a nearly normal oblique position, additional sutures were applied which passed through the anterior surface of the right half of the stomach and through the capsule and margin of the left lobe of the liver.

Nyrop (*Muench. Med. Woch.*, No. 2, 1907) takes the position that gastropexy aggravates the condition of the patient when there are bends and kinks in the pyloric region, and makes it still more difficult for the stomach to evacuate its contents, owing to the presence of the adhesions induced by it. He says that the results obtained in Schou's clinic (Copenhagen) with gastro-enterostomy in the treatment of gastroptosis with retention are entirely in favor of this operation, which removes all disturbances, notwithstanding the persistence of the ptosis. Of 21 patients operated upon up to last May, 18 were permanently relieved of the manifestations caused by retention.

Stengel and Beyea have also obtained success in the treatment of gastroptosis in a manner similar to that practised by Bier.

Gastroplication (*Brandt's Stomach-reefing Operation*).—When there is both ptosis and a marked dilatation of the stomach, gastropexy should be combined with gastroplication. Brandt diminishes the circumference of the stomach by forming a decided reef in the anterior wall of the organ and then opens up the omentum and infolds and sutures the posterior wall. Interrupted or continuous seromuscular sutures may be employed. In a successful case operated upon by Brandt more than two hundred sutures were required.

Bircher's gastroplication consists in depressing the anterior surface of the stomach with forceps to such an extent that the greater curvature can be lifted up and over it and stitched to the lesser curvature. In a case operated upon by this authority, the patient was up before the end of the second week and made an uneventful recovery, notwithstanding the fact that thirty-five seromuscular sutures were necessary to effect the infolding.

Weir's plan of making the folds more numerous and not so deep is preferred by some operators.

Moynihan has succeeded in narrowing the stomach by the introduction of a series of purse-string sutures a short distance apart and along the anterior wall from the cardiac to the pyloric end, which, when tied, narrow the stomach at several points.

Gastro-enterostomy.—This operation is occasionally justifiable in cases of splanchnoptosis complicated by gastric retention resulting from angulation, kinking, or adhesions located at or near the pyloric opening, which cannot be relieved in other ways. In performing this operation, the *sutures alone* method, the McGraw rubber ligature, or the Murphy button may be employed, and the intestine may be joined to either the anterior or posterior wall of the stomach.

The operation should be performed in such a way that regurgitation and the establishment of a vicious circle will be avoided.

Almost as many different ways of performing gastro-enterostomy have been suggested as for anastomosing the intestine; of these, the technics of Mayo, Von Hacker, Roux, Senn, Jaboulay, McGraw, and Wolfler are most generally practised. For a detailed description of the different ways of performing gastro-enterostomy, the reader is referred to the standard text-books on surgery.

TREATMENT OF HEPATOPTOSIS

Displacement of the liver may be *partial*, when the right or Riedel's lobe falls below its normal level, or *complete*, when the entire organ descends below its normal limitations. Both conditions produce distressing manifestations and call for relief at the earliest opportunity.

One is justified in making an attempt to relieve hepatoptosis by having the patient rest in the recumbent position a considerable portion of the time with the foot of the bed elevated, and wear a support while in the erect or sitting postures, with forced feeding to increase the intra-abdominal fat, and the use of massage to strengthen the abdominal and intestinal musculature.

Non-operative measures fail to give the much-needed relief in the majority of these cases, and sooner or later it becomes necessary to resort to one of the surgical procedures presently to be described in order to accomplish a cure.

The method of procedure must be modified from time to time to meet the indications in different cases. In one instance *cholecystotomy* and drainage of the gall-bladder will give immediate relief, especially when the trouble is due to displacement of Riedel's lobe; in another, *hepatopexy* will be the operation of choice, and in still another, *hepatectomy*, partial or complete, may be required. Sometimes it is advisable to combine one of the operations named with other surgical procedures described elsewhere.

Hepatopexy.—Fixation of the liver to relieve hepatoptosis was originally suggested by Kisbert (1884), but the operation was first performed by Billroth (1894), who anchored one mobile lobe. The first total hepatopexy was performed by Miche (1889) and the second by Gérard-Marchant (1891), since which time the operation has been performed quite frequently with good results.

Some surgeons, after scarifying the liver by rubbing it with a piece of gauze, have stitched it to the costal margin, while others have attached it to the abdominal wall. Legueu suspends the liver by a double ligature which passes entirely through it, while Péan endeavors to correct the ptosis by placing the liver in a pocket formed by stripping the serosa from the anterior parietes, pulling it over, and sewing it to the peritoneum at the side of the abdomen. Moynihan replaces the organ, sutures its anterior edge to the costal margin, and then places gauze strips between the liver and the diaphragm, which are left for a few days to act as an irritant and encourage the formation of extensive supporting adhesions. During convalescence the patient is kept in a bed the foot of which is elevated.

Rovsing's Hepatopexy (Volkmann's *Sammlung Klin. Vorträge*, 431, August, 1906).—This authority suspends the liver by first scarifying and then anchoring it with two or three rectangular catgut sutures which pass through the serous lining of the diaphragm and the margin of the liver, where they are tied. When replacement of the stomach is interfered with by an elongation of the left liver lobule, he crushes it with Roux's angiotribe, which prevents bleeding when it is removed, and then ligates each projecting artery to preclude future bleeding. The operation is completed by stitching the serosa together above the liver margin, but when the serosa is delicate and breaks, the liver wound is covered by a piece of omentum. The 4 cases operated upon in this way made uninterrupted recoveries.

Rovsing found hepatopexy necessary in 22 out of 75 cases of hepatoptosis reported by him.

Depage's Hepatopexy Plus Laparectomy (*Archiv. f. Klin. Chir.*, vol. lxxiii., 1904).—Depage succeeded in relieving 1 case of hepatoptosis by making an incision parallel with the intercostal curve and forming a flap of the peritoneum above, which was brought down and fastened to the lower margin of the liver by a suture passed through it. When hepatoptosis is complicated by relaxation of the abdominal wall, Depage performs coporectomy and then suspends the liver. He removes a good-sized skin flap together with the subcutaneous connective tissue, and resects the linea alba and peritoneum as far as the internal margin of the recti muscles. The round ligament is then drawn upward, shortened, and anchored in the upper angle of the wound in such a manner that it causes the liver to lie in its normal position. This operation has been performed by Depage 5 times, with 4 recoveries and 1 death.

Soupault (*Gazette des Hôpitaux*, Nos. 41–43, 1901) has reported 15 cases of total hepatoptosis treated by hepatopexy. Out of this series, there were 11 recoveries, 2 improvements, and 2 deaths. When he succeeded in returning the liver to its normal position, the painful abdominal manifestations and neurasthenic disturbances disappeared in a short time, but when the organ could not be replaced exactly where it belonged, the results were not so good.

Soupault cites, in addition to his own, 7 cases of hepatoptosis successfully treated by Terrier and Auvray by means of hepatopexy.

Hepatectomy is occasionally resorted to in the treatment of hepatoptosis, but the majority of operators prefer hepatopexy because it is both simple and effective. For a detailed description of the various ways of performing hepatectomy, I beg to refer the reader to Moynihan (*Abdominal Operations*), who has so vividly depicted them.

TREATMENT OF SPLENOPTOSIS

When the non-operative measures already recommended for the cure of enteroptosis fail to secure the desired relief, the spleen should be suspended or removed.

Splenopexy yields very good results in cases of splenoptosis, except where the organ is much enlarged or diseased, and is not nearly so dangerous as is extirpation. Rydygier first called attention to this operation in 1895 and reported a case of wandering spleen relieved by splenopexy, but both Tuffier (1882) and Kouwer (1891) claim priority for this procedure, on the ground that they had performed splenopexy before Rydygier published his case.

Rydygier's Splenopexy.—This authority opens the abdomen in the median line, divides and frees the peritoneum from its attachments, thereby forming an extraperitoneal pocket to hold the spleen when replaced. The peritoneum is then sutured to the underlying structures and splenic ligament.

Bardenheuer's Splenopexy.—This operator approaches the spleen by means of two incisions: the first extends from the tenth rib to the crest of the ileum, and the second, or transverse, along the border of the rib. The spleen is then drawn through the peritoneum, which is immediately closed snugly around it by means of a purse-string suture; it is next suspended by sutures which pass beneath it and are then tied to the tenth rib.

Zikow advocates the suspending of the spleen in a basket made of catgut, which will retain the organ in place until adhesions have formed which hold it permanently.

Tuffier anchors the spleen to the abdominal wall or diaphragm by means of sutures which dip down into the substance of the organ.

Basil Hall (*American Surgery*, April, 1903) reports success in 1 case of splenoptosis, where the lower pole of the spleen was brought up and fixed in the wound and surrounded with peritoneum and the abdominal aponeurosis, by means of a purse-string suture passed around the narrow isthmus at the notch, after the remainder of the organ had been returned to the abdomen. The operation was completed by making the rectus overlap the projecting portion of the spleen and then approximating the skin edges.

Kouwer has obtained good results by packing iodoform gauze about the spleen, which excited an inflammation and the formation of extensive adhesions, which served to retain the organ in position.

Ceccelli fixes the spleen to the rib, and maintains that the passage of the sutures into the parenchyma of the organ has no untoward result. He effected a complete cure of floating spleen in this way.

Grandi has on three occasions relieved patients suffering from ectopic hypertrophic spleen (malaria) by splenopexy. In a fourth case operated upon by him, it was found advisable to do a partial resection of the organ and then to suspend it.

Mariani, after citing 14 cases of splenopexy, recommends conservative surgical procedures and preservation of the spleen when it is ptotic or slightly diseased and is still functionating. He prefers the technic of Parona.

Splenectomy.—This operation is sometimes resorted to when the spleen is enlarged from malaria, but is rarely practised for the relief of splenoptosis, owing to the vascular disturbances and the high mortality which follow. When done for wandering spleen, the results are much better when there is no leukemia. When the last-named condition is present, splenopexy and other measures less radical than splenectomy are indicated. Examination of the blood for malaria and leukemia in this class of cases is of great service in clearing up the diagnosis and helping the surgeon to decide upon the best operation.

In the performance of splenectomy, the organ is usually approached through an incision of moderate length made in the median line or through the left rectus muscle. After the peritoneum has been opened, adhesions should be broken up, and the spleen brought outside, care being taken to avoid dragging upon the pedicle, which would cause collapse through injury to the splenic nerve plexus. The organ is then removed after the pedicle below has been clamped with forceps or, preferably, transfixed and ligated. The threads should be cut short and all bleeding arrested by reënforcing ligatures before the stump is returned to the abdomen. The mortality following this operation is due principally to hemorrhage. Collier's statistics show that about 50 per cent. of the cases die from loss of blood.

Splenectomy is sometimes made extremely difficult or impossible by the presence of extensive adhesions, which bind the spleen to adjacent organs or structures.

TREATMENT OF NEPHROPTOSIS

More attention should be paid to the non-surgical treatment of wandering kidney than to operative measures, because nephropexy (nephrorrhaphy) is not so successful in relieving the manifestations arising from this condition as are gastropexy, hepatopexy, and colopexy in overcoming the symptoms induced by a ptotic stomach, liver, or intestine. The surgeon is not always able to restore the kidney to its normal position by means of nephropexy, and when he cannot do so, or it again becomes displaced after being fixed, the patient will continue to suffer from abdominal pain, obstipation, and a host of nervous phenomena.

Sérégé (*Jour. de Med. de Bordeaux*, Nos. 21, 22, 1904) discovered 88 nephroptoses among 278 patients who suffered from nutritional disturbances, and, based upon this experience, he takes the position that floating kidney is the terminal stage of general enteroptosis (splanchnoptosis). If this attitude is correct, then it is frequently advisable to anchor the stomach, liver, or spleen individually or collectively during the operation made to restore and fix the kidney in place.

Rovsing's Nephropexy (Volkmann's *Sammlung. Klin. Vorträge*, 431, August, 1906).—This authority aims at fixing the kidney in a perfectly normal position, so that no more than one-fourth of the organ projects below the twelfth rib, and to the soft parts in preference to the rib (Guyon), the transverse process (Howitz), or some other part of the skeleton. He further endeavors to place the sutures in such a way that they do not surround the kidney and induce necrosis, or remain behind to cause future irritation.

Rovsing makes an incision which begins corresponding to the tenth rib and passes longitudinally along the outer margin of the erector spinæ to a point 2 centimeters below the twelfth rib, where it makes a slight forward curve to the extent of 6 to 8 centimeters. The lumbodorsal fascia are exposed and bluntly perforated at the angle just below the twelfth rib, bringing into view the retroperitoneal fat. This opening is then enlarged in a longitudinal direction from the rib to the iliac crest with the aid of forceps. The transverse fascia is then separated from the peritoneum, and the abdominal muscles are severed as far as necessary in the direction of the skin incision. The kidney is now pushed up into the wound, and its outer fibrous capsule opened, beginning posteriorly, to avoid injury of the delicate peritoneum. This brings the perirenal fat into view, where it can be divided so as to expose the membrana propria of the kidney. The organ is now seized and brought well up into the wound, where all adhesions are broken up before the kidney is anchored. Rovsing lays great stress upon the necessity of dividing each strand of connective tissue, which otherwise might in the future cause pain or help to displace the kidney again.

Lambotte's Transperitoneal Nephropexy (*Jour. de Chir. et Ann. d. la Soc. Belge. de Chir.*, October, 1904).—This operator, according to the requirements of the case, reaches the kidney through a median or lateral incision, and by incising the posterior peritoneal wall, he then frees it of the capsule from behind. Fixation of the organ is accomplished by four silk sutures which are tied across a roll of gauze after they have been made to pass through the substance of the kidney and the soft parts of the lumbar region.

Bardenheuer's Nephropexy (*Münch. Med. Woch.*, No. 18, 1903).—In this procedure, the quadratus lumborum is divided into two halves, the anterior of which is detached from the iliac crest at the upper margin of the pelvis, and doubled back and upward to form a bed or pocket for the kidney, after it has been freed from its fatty capsule. Bardenheuer states that the outcome of the operation has always been very satisfactory.

Friedrich's Nephropexy (*Archiv. f. Gynek.*, vol. lxxii., 1904).—This operator stitches the split and partly detached capsula propria of the kidney to the integument; the wound is then encouraged to heal slowly, so that the granulations of the skin will mingle with those of the renal capsule and parenchyma, in order that the integumentary epithelium may reach the kidney.

Fullerton (*British Medical Journal*, No. 2295, 1904) exposes the kidney and unites a horseshoe-shaped piece of the posterior capsule, which has been peeled off, with the external anterior ligament, which takes a more horizontal course than the twelfth rib.

Sonnesin (*Revista di Cir.*, Nos. 11, 12, 1904) anchors the kidney parallel with and close to the eleventh or twelfth rib by two wire sutures which pass through the skin, the split capsule, the renal poles (upper and lower), and the last intercostal space; the stitches are removed on the fifteenth day.

Franks also sutures the kidney to the twelfth rib, but uses catgut instead of wire sutures.

Mariani (*Gazetta degli Ospedali*, No. 91, 1903), on the basis of animal experimentation, recommends subperitoneal resection of the twelfth rib and exposure of the upper pole, followed by perforation of the kidney with a trocar and the passage through it of a peritoneal strand, and finally, the attachment of the remaining serosa to the muscles of the eleventh intercostal space.

Both Senn and Deaver suspend the kidney with gauze strips and then pack additional gauze in the wound about it with the object of exciting an active inflammation, with formation of extensive adhesions and permanent fixation of the kidney, after the gauze has been removed.

Henry Morris fixes the kidney by means of three silk sutures which are passed in succession through the fibrous capsule, the kidney proper, the transversalis fascia, and the aponeurosis of the transversalis muscle.

Edebohls anchors the organ to the abdominal wall by four sutures, two of which pass through the capsula propria from within outward.

STRETCHING THE LINEA ALBA

J. C. Webster (*Jour. Amer. Med. Assoc.*, December 22, 1900) describes a novel procedure for overcoming enteroptosis (splanchnoptosis) due to separation of the recti muscles.

He divides the skin and subcutaneous fat and reaches the linea alba by a median incision, the length of which is varied according to the extent of the separation of the recti. After the fascia has been freed of fat as far as the edge of the muscles, the sheath of each is then divided at the inner border and the recti are loosened from their internal attachments. The muscles are then joined in the median line by a series of linen sutures which pass through them and the anterior fascia from side to side. The operation is completed by closing the fascia and skin with catgut. The bulging of the integument which evidences the reduction in the abdominal wall gradually disappears. When the amount of integument is excessive, a strip of the skin and subcutaneous fat should be removed on either side of the wound to diminish the deformity. Webster has performed this operation 51 times, followed in every instance by a marked improvement or complete cure.

When there was a marked ptosis of the right kidney or retroversion or prolapse of the uterus, these conditions were overcome by surgical measures. Following the operation, Webster advises his patients to abandon corsets, to support the skirts from the shoulders, to avoid sudden or severe exertion for six months, and in the meantime to resort to massage or mild exercise to strengthen the abdominal muscles.

CHAPTER XLIII

SURGICAL TREATMENT OF MECHANICAL CONSTIPATION

Treatment of Paralytic Ileus. Dilatation of the Colon. Enterospasm. Intestinal Parasites. Hypertrophied O'Beirne's Sphincter. Rectal Valves. Levator Ani and Sphincter Muscle. Deviated Coccyx.

TREATMENT OF PARALYTIC ILEUS

When the motor insufficiency of the bowel is referable to distinct anatomic lesions, such as acute general peritonitis, mesenteric embolism, or acute orchitis, the condition can sometimes be relieved by timely surgical interference, with removal of the primary cause, but the prognosis of *postoperative* paralytic ileus is always extremely grave, even when attempts are made to relieve the distention by single or multiple enterotomies and other procedures.

TREATMENT OF DILATATION OF THE COLON

When the colon is enormously elongated, enlarged, and hypertrophied, it causes obstinate constipation, no matter whether the condition is congenital or acquired.

Non-operative measures, such as regulating the diet and the employment of faradization and friction-massage, together with intestinal lavage and the administration of laxatives to keep the bowel open and secure an evacuation as often as required, add much to the comfort of this class of sufferers, but accomplish little toward the cure.

The strongest laxatives and cathartics frequently fail to bring about the necessary movements, and the feces collect in large quantities in the sagging parts of the dilated colon, where they remain, to become hardened and form scybala or large oval putty-like masses which are exceedingly difficult to remove. Under such circumstances large doses of olive oil or liquid paraffin should be administered daily to lubricate the bowel and soften the feces, while copious high enemata are being given to dissolve and dislodge the masses and enable the patient to evacuate them. In many cases separate doses of castor oil will serve the purpose of relieving the bowel of an impaction better than any other cathartic; this drug, however, should not be administered steadily to secure the desired evacuation because of its secondary constipating effect.

Massage may be employed with the object of breaking up and moving the feces downward when there is no soreness, but if manipulation causes pain, the presence of ulceration is indicated, and massage should be discontinued to avoid the possibility of rupturing the intestine.

The measures already discussed must be relied on for clearing the cecum, ascending, transverse, and descending colons of fecal accumulations, but when the impaction takes place within the sigmoid flexure, it can be broken up and washed out through the sigmoidoscope with the aid of a long-handled blunt instrument or scoop and an effective irrigating apparatus. Fecal masses located in the rectum are most frequently gotten rid of by breaking them into small pieces with the finger or handle of the spoon, and then injecting 3 or 4 ounces of oil to soften them. Usually the patient will have a copious evacuation in a short time, much to his relief. When the entire collection does not come away with the first movement, soap-suds or oil enemata should be administered at short intervals, until the remainder has been evacuated.

Megacolon is essentially a surgical disease, and non-operative measures should be discontinued in favor of an operation at the first opportunity, in order to afford the patient a chance of obtaining permanent relief. The nature of the operation must necessarily vary in different cases, depending upon the size and length of the dilated colon, and whether it is bound down by adhesions, is angulated, rotated upon itself, or blocked by the presence of a stricture or a tumor. The results following operations for the relief of acquired colonic dilatation are better than those obtained in the correction of a congenitally enlarged and elongated bowel.

The following operative procedures are those which have been most favorably received in the treatment of this colonic dilatation—viz.: (*a*) Coloplication, (*b*) colopexy, (*c*) resection, (*d*) intestinal exclusion, (*e*) colostomy, and (*f*) tapping.

Coloplication (Fig. 221) has been known to give fairly good results and is worthy of a trial because it is not dangerous and will do no harm even when unsuccessful. I usually infold the colon at three points, once on either side, and upon the anterior surface at the side of the longitudinal band, which diminishes its size about one-third. The peritoneal surfaces of the gut are scarified, and then a number of interrupted sutures of the Lembert type (Fig. 143) are introduced, which, when tied, cause the desired amount of infolding.

In my earlier cases (2), nothing was done except to narrow the bowel in the above-described way; improvement of the patients' condition was notable in each instance, but was not as marked as I had hoped.

The imperfect cure I attributed to the existing ptotic condition of the colon. In my more recent operations (3) for dilatation, I have combined coloplication with fixation of the bowel to the abdominal wall, to prevent its falling down and becoming angulated or twisted.

This supplementary part of the operation requires but little additional time, because the sutures which produce the infolding on the anterior surface of the gut are left long and used to suspend it. The results obtained from the combined operation have been better than those derived from coloplication, and I would recommend the operation for further trial.

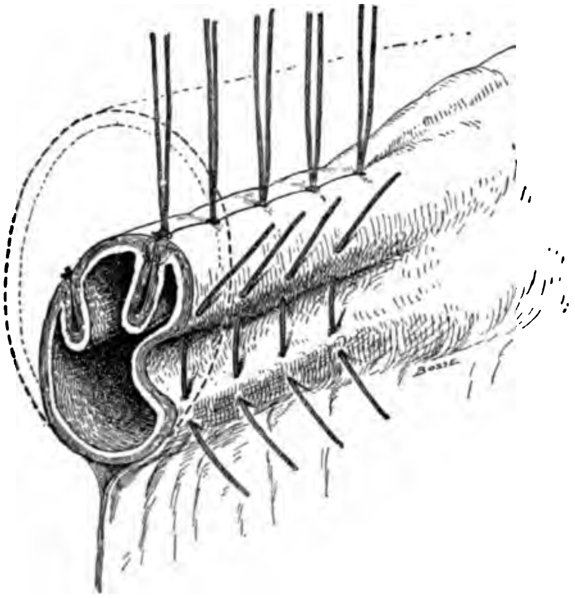

Fig. 221.—Dotted lines indicate the size of the dilated colon, the untied Lembert-like sutures the way in which the bowel is infolded and the peritoneal surfaces of the gut are brought into contact; the stitches which are tied serve to anchor the intestine to the abdominal parietes.

Both Kredell and Brook (*British Medical Journal*, May 13, 1905) have successfully treated cases of colonic dilatation by longitudinal infolding of the gut.

Colopexy has been successfully employed for the relief of dilatation of the colon by Kümmel, Trommer, Wooliner, and the author. The different ways of performing this operation have already been described. As a general rule, it may be stated that anchoring of the colon to the abdominal wall will not prove entirely satisfactory, except when it has been preceded by coloplication.

Resection of a part or all of the large intestine is justifiable when the gut is enormously elongated, enlarged, and hypertrophied, because it is useless, displaces and disturbs neighboring viscera, and nothing short of this radical procedure will prove successful.

Colonic resection is not so difficult or dangerous as those inexperienced in intestinal surgery would suppose.

Treves (*Lancet*, i., 1898) successfully excised the rectum, sigmoid, and descending colon for dilatation, extending upward to the splenic flexure. In this case he succeeded in bringing the left end of the transverse colon down and suturing it to the anus, which avoided the necessity of forming a permanent artificial anus.

Richardson (*Boston Medical and Surgical Journal*, February 14, 1901) has reported a case where he successfully removed the sigmoid, but goes on to state that a new reservoir formed within fifteen months, which became dilated and filled the lower abdomen.

Elsewhere I have reported a case where the rectum, sigmoid flexure, the descending and left half of the transverse colon were successfully removed for the cure of multiple stricture of the intestine (see Stricture).

Giordano (*Arch. Internat. de Chir.*, vol. i., 1904) cured a girl ten years of age suffering from megacolon by complete ablation of the colon and ileorectostomy, and Braun (*Münch. Med. Woch.*, 39, 1903) performed resection of the sigmoid and entero-anastomosis in 2 cases, but both operations proved unsuccessful.

Lane has done more work along this line than any other operator and has reported (*British Medical Journal*, January 18, 1908) 39 cases with 7 deaths, where the cecum or the entire colon was removed for the relief of chronic constipation.

Exclusion of an enlarged or dilated colon is justifiable when for any reason the case is unsuitable for the operative measures previously discussed. I obtained a very satisfactory result in 1 case by cutting out the entire colon, dividing the ileum, closing the cecal end, and anastomosing the other with the sigmoid flexure; the appendix was then brought out through the right side, sutured to the skin, and the projecting end amputated to provide a way for draining and irrigating the excluded segment of bowel.

Colostomy is sometimes resorted to in the treatment of megacolon and other forms of extreme dilatation to afford relief from gas distention and the distressing manifestations arising from fecal impaction and auto-intoxication, and also as a preliminary step to resection when it is necessary immediately to relieve an obstruction and prepare the bowel for the more radical operation to come later.

Some cures of idiopathic dilatation of the colon have been obtained through the establishment of an artificial anus without resection. The good results were due to the free vent given to the feces, the rest afforded the diseased bowel, and the washing out of noxious substances with sterile water or medicated irrigations.

Gwinne (*Quar. Med. Jour.*, 1902) and Osler (*Arch. Pediat.*, vol. x., p. 113, 1893) have reported successful cures by this procedure. In both these cases there was a marked retrogression of both dilatation and hypertrophy of the colon shortly following the operation.

Tapping of a dilated colon to relieve the distress arising from gas distention has been resorted to in a few instances; in fact, Cheadle (*Lancet*, vol. i., p. 399, 1898) reports a cure accomplished by first performing celiotomy, then puncturing the gut to relieve the distention, and completing the operation with the establishment of an artificial anus, which closed spontaneously.

Tapping of the bowel should be condemned as both unscientific and dangerous. The treatment of other forms of colonic dilatation does not differ materially from the above, unless it is due to a tumor which requires excision.

TREATMENT OF ENTEROSPASM

The *non-operative* treatment of enterospasm has been fully discussed in the chapter devoted to the Treatment of Spastic Constipation. When enteric spasms are of such a nature as to induce almost complete obstipation, and when they cannot be relieved by non-surgical measures, relief should be given to the patient by opening the bowel and providing drainage (*enterostomy*), but when they become chronic and produce great pain and troublesome constipation, it may, in rare instances, become necessary to *resect* or *exclude* the involved segment of gut or establish an artificial anus, procedures which have already been discussed.

TREATMENT OF INTESTINAL PARASITES

Certain drugs, notably santonin, are indicated according to the variety of parasite present, their administration to be preceded by fasting and followed by very active purgation. Irrigation of the colon with hot saline and astringent solutions, as well as rectal enemata, are indispensable, and should be combined with hot abdominal fomentations, in the presence of complicating enterospasm. Large accumulations of worms in the rectum or sigmoid flexure, after having been detected with the aid of the proctoscope or sigmoidoscope, may be washed out or removed with forceps. When massed in the upper colon or small intestine, giving rise to obstipation and resisting dislodgment by medication or intestinal lavage, worms may necessitate enterotomy, or when they have produced extensive ulceration or catarrhal inflammation, an additional colostomy, appendicostomy, or cecostomy, in order to provide for through-and-through irrigation.

TREATMENT OF O'BEIRNE'S SPHINCTER WHEN HYPERTROPHIED

Constipation frequently arises from irritation and thickening of this band of muscular fibers, which is located at the rectosigmoidal juncture. When this condition is present the regularity of the stools is interrupted and the feces accumulate in the sigmoid flexure, because they are prevented from reaching the rectum, owing to the frequent and persistent contractions of the sphincter as soon as the stimulus reaches it.

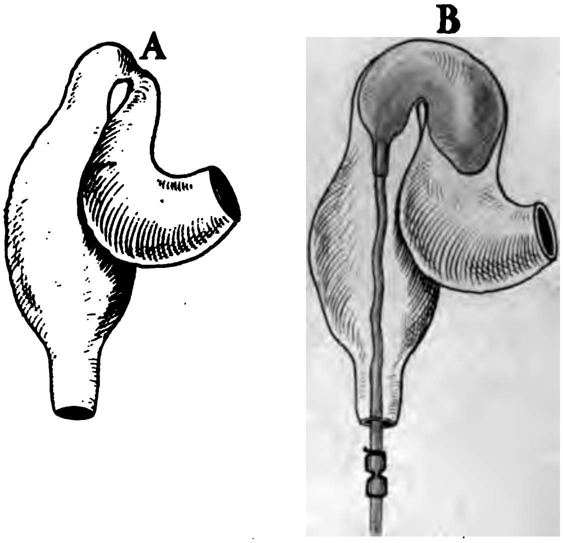

Fig. 222.—A, Strictured O'Beirne's sphincter; B, method of divulsion with Gant's modification of Barnes' bag.

When the irritability of the sphincter is due to ulceration or catarrhal inflammation, much can be done by the application of hot fomentations to the lower abdomen to soothe the bowel, and the daily injection of hot oil containing bismuth or a solution of ichthyol, hydrastis, krameria, and soda, permanganate of potassium, or boric acid, to reduce the inflammation and heal the ulcers.

When enterospasm is of frequent occurrence, it can be effectively controlled by the administration of small doses of belladonna alone or in combination with opium.

In cases of obstipation induced by hypertrophy of O'Beirne's sphincter (Fig. 222, A) to such an extent that the bowel is considerably occluded, divulsion of the sphincter is indicated. It can be easily and quickly dilated by introducing a large proctoscope up to the obstructed point and then passing a Wales bougie of proper size through it. Divulsion

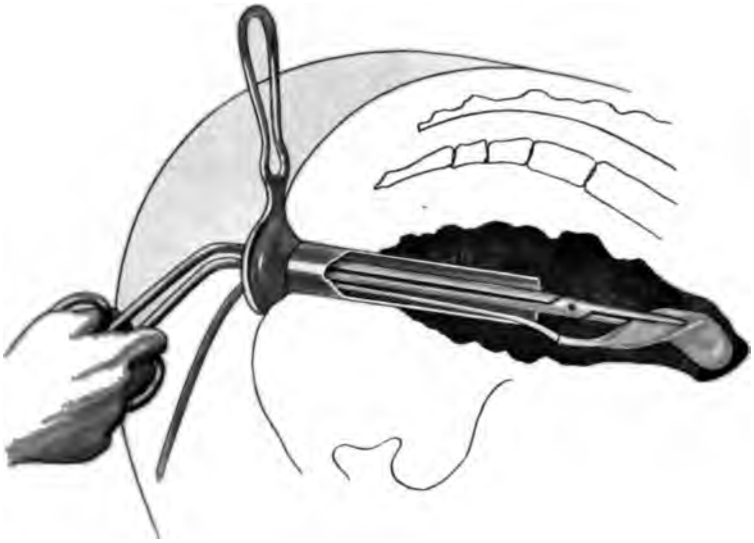

Fig. 223.—Author's method of introducing the rubber bag into the sigmoid flexure.

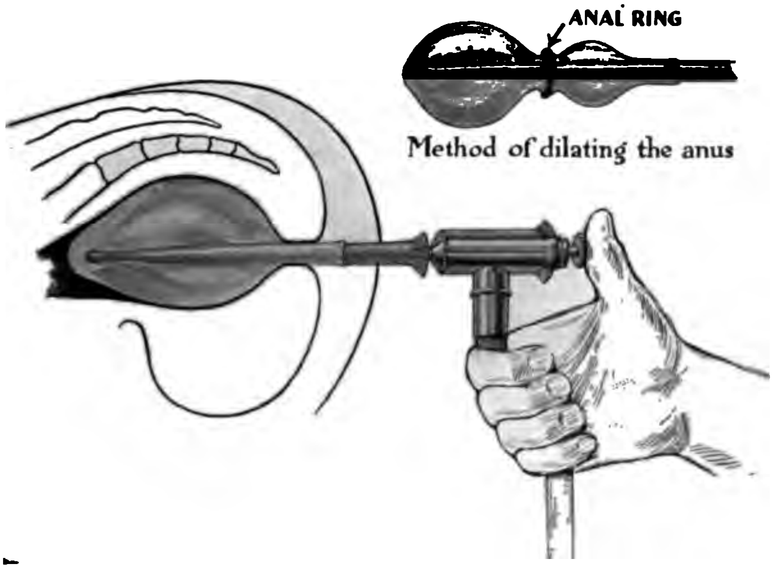

Fig. 224.—Method of dilating the rectum and the anus with Hirschmann's dilator.

can also be satisfactorily accomplished by tamponing with a rubber bag (Fig. 223) distended with air or water left *inside* as long as may be required (Fig. 222, B), or with the Hirschmann dilator (Fig. 224).

The treatment may be applied daily or two or three times weekly, according to the exigencies of the case. Careless stretching of O'Beirne's sphincter with bougies and mechanical dilators is extremely dangerous.

When the treatment outlined fails, surgical intervention is imperative, and the obstruction should be relieved by colostomy, resection of the sphincter, or by making an anastomosis between the sigmoid above and the rectum below.

TREATMENT OF HYPERTROPHIED RECTAL (HOUSTON'S) VALVES

The rectal valves (Figs. 9–13) may become hypertrophied as the result of chronic colitis, ulceration, and other affections of the lower bowel, and when they are rigid may project into the lumen of the gut and prevent the feces from reaching the anal outlet, to be expelled. Under such circumstances, lumps of fecal matter can often be seen resting on the upper or concave surface of the valves.

It has been claimed by some writers that the obstinate constipation which is occasionally induced in this way can be corrected by the introduction of rectal bougies to massage the valves. I have faithfully tried this plan of treatment at different times, but have never known it to relieve this condition when used alone.

When the valves are markedly hypertrophied, nothing short of their division will effect a cure. Martin first suggested *valvotomy*, and devised a method of performing the operation. He exposed the valves by means of a large proctoscope, divided them with a long-handled bistoury, and closed the wound with catgut, using a long-handled needle, or permitted the cut to heal by granulation.

The Martin operation is unsatisfactory because it may be accompanied by profuse bleeding which is difficult to control, there is danger from infection, the patient complains bitterly of gas pains induced by blocking of the rectum with tampons, it has been followed by peritonitis, and it confines the patient to his bed for several days.

In order to overcome the disadvantages of Martin's operation, Pennington devised a *clip*, which when adjusted divides the valves by pressure-necrosis. This instrument has not given entire satisfaction because it does not sever the valves deeply enough, and further, because it is difficult or impossible to remove and replace it when it has been improperly applied.

Shortly after the advent of the Pennington clip I devised a clamp

(Fig. 225) with which the valves can be satisfactorily divided, and also a pair of applicator forceps (Figs. 225, 226), by means of which it can be easily and quickly applied.

The technic of the author's valvotomy is as follows: A clamp is placed in the applicator and its jaws opened by locking the handles of the instrument (Fig. 225) and the forceps laid aside until needed. The patient is then placed in the knee-chest posture, the rectum is inflated, and the center of the valve to be divided is exposed by means of an operating proctoscope and reflected light. The applicator is then picked up and the clamp is pushed well down over the valve and released by unlocking the handles of the forceps (Fig. 226).

The entire procedure does not require more than one minute, and rarely causes pain or discomfort. In order to prevent distention pains from the air which has entered the intestine during the inflation, the patient should be requested to lie upon the left side and strain, while the proctoscope is removed in order to free the bowel from air. I have performed more than 100 valvotomies in this way, and the results have been very satisfactory. The principal advantages of this procedure are: it can be done in the office, requires but a moment, causes but little if any pain or bleeding, no danger of infection, does not interfere with the occupation of the patient, and effectively divides the valve, which drops downward (Fig. 225), so that it no longer interferes with the passage of the feces.

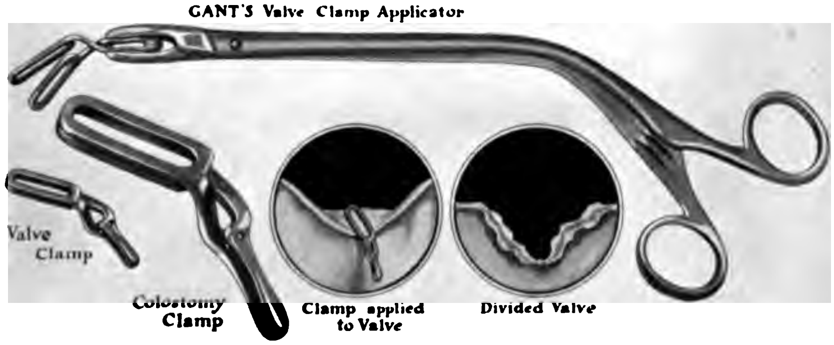

Fig. 225.—Author's valvotomy instruments. The two drawings show the appearance of the applied clamp through the proctoscope, and the ulcerated edges of the valve after it has cut its way out.

Lynch has devised a cautery apparatus for dividing the valves. I have had no personal experience with this instrument, but have treated 1 case of carcinoma which occurred at the point where the valve was divided in this way, and which, according to the statement of the patient, was referable to the valvotomy. Hirschmann has suggested division of the valves with a rubber ligature, and has invented a carrier for the purpose. I have one of Hirschmann's instruments and have used it on several occasions, but have discarded it because it is cumbersome, causes considerable pain when pushed through the valve, and has no advantage over my own clamp.

In some instances valvotomy is followed by an immediate cure, but in the majority of cases I have found it advisable to institute a post-operative course of massage, electric, or vibratory treatment in order to stimulate and strengthen the colon, which is often atonic.

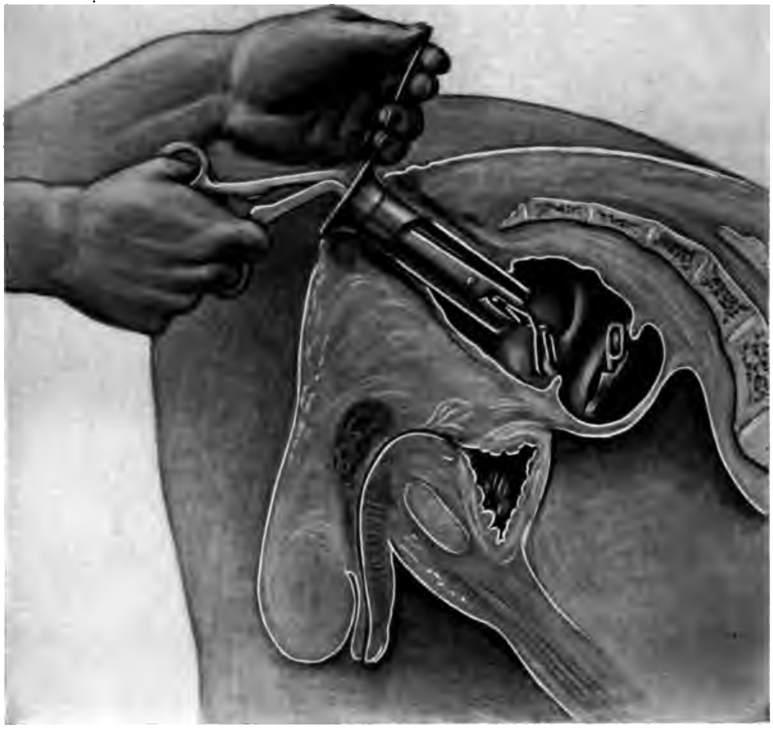

Fig. 226.—Showing author's valvotomy.

The increased frequency of evacuations immediately following this operation may be partly attributable to the stretching of the sphincter by the large proctoscope and partly to the ulcerated wound left, which serves to excite more frequent and effective peristalsis. I have never known a stricture to follow division of the valve with the clamp.

Valvotomy is a very useful procedure, but the necessity for it is not nearly so common as the writings of some authorities would indicate.

TREATMENT OF THE LEVATORES ANI MUSCLES WHEN HYPERTROPHIED

I have treated several patients who suffered from this type of constipation. When these muscles become irritable or hypertrophied they clamp the rectum laterally (Figs. 14, 15) and completely block the passage. In some cases they can be felt at all times as thick, rigid bands crossing and pushing the rectum inward about 2 inches above the anus; but in others they become irritable and spasmodically contract upon the introduction of the finger. Under such circumstances, when hardened fecal masses reach the lower rectum, they excite the levatores ani to contract. I have known these muscles to remain rigidly contracted for a considerable time, and then induce both obstipation and the most excruciating pain.

When this type of constipation is temporary and is induced by irritability of the muscle, applications of heat at the anus and inside the rectum do much to soothe and relax, but when ineffective, a suppository containing belladonna or opium should be inserted. When the muscle has become markedly hypertrophied, an operation is necessary.

Elsewhere [1] I have reported 6 cases of obstinate constipation induced by hypertrophic levatores ani muscles cured by operation. In 3 the coccygeal attachments of the muscle was severed under local anesthesia by *subcutaneous tenotomy.* In 2 others the coccyx was reached through a 2-inch posterior incision, and the muscle completely severed from its bony attachment, after which the wound was closed by interrupted sutures of catgut. The sixth case was not relieved by severing the muscle from the bony attachment, and it was found necessary later to amputate the coccyx and perform myotomy to destroy the action of the muscle upon the rectum. The steps in the latter operation are about the same as the first part of the operation for excision of the lower part of the rectum.

Since the publication of the above cases I have successfully treated several others in a similar manner.

TREATMENT OF HYPERTROPHIED SPHINCTER MUSCLE

Owing to the frequency of disease at the anal outlet the external sphincter is excited to frequent contractions, in consequence of which the muscle may become irritable or hypertrophied and interfere with the evacuations. Regulation of the diet, cathartics to soften the stools, heat and soothing lotions, and ointments which diminish anal soreness (see Treatment of Hemorrhoids) help to overcome the constipated state when the muscle is irritable and spasmodically contracts upon the approach of the stool (Fig. 227); but when the external sphincter is

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[1] Gant, *Diseases of the Rectum and Anus,* third edition, p. 102.

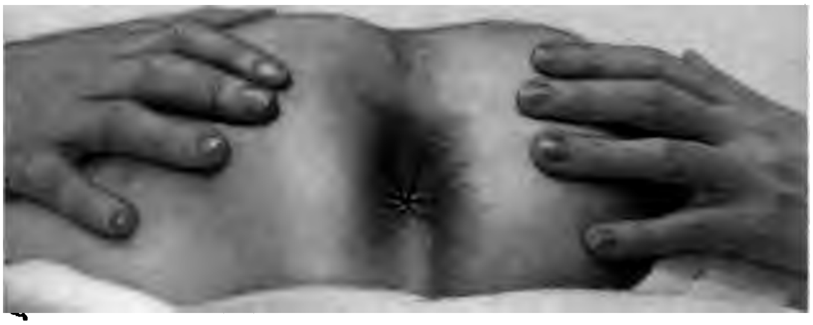

Fig. 227.—Tightly contracted anus induced by spasm of the sphincter. This muscle must be divided before constipation due to this condition can be relieved.

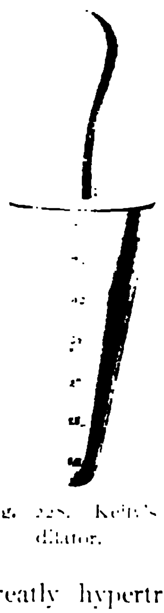

Fig. 228. Kelly's dilator.

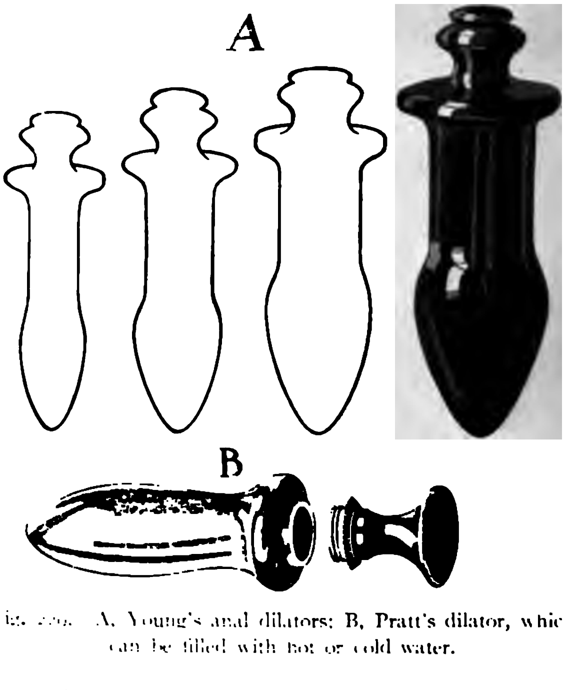

Fig. 229. A, Young's anal dilators; B, Pratt's dilator, which can be filled with hot or cold water.

greatly hypertrophied or has undergone fibrous degeneration, and offers a constant obstruction to the passage of the feces, *palliative* should be discarded for *surgical* measures. This type of mechanical constipation can always be improved and usually cured by *divulsing* or *dividing* the muscle.

Divulsion may be accomplished gradually by the aid of anal dilators (Figs. 228, 229) and bougies, or quickly (forcibly) by thoroughly stretching the sphincter with the thumbs or index-fingers. Forcible divulsion can be performed under either local or general anesthesia. There is no objection to producing a temporary paralysis of the muscle by stretching, but in so doing care is needed to avoid rupture of the muscle, an accident followed by incontinence.

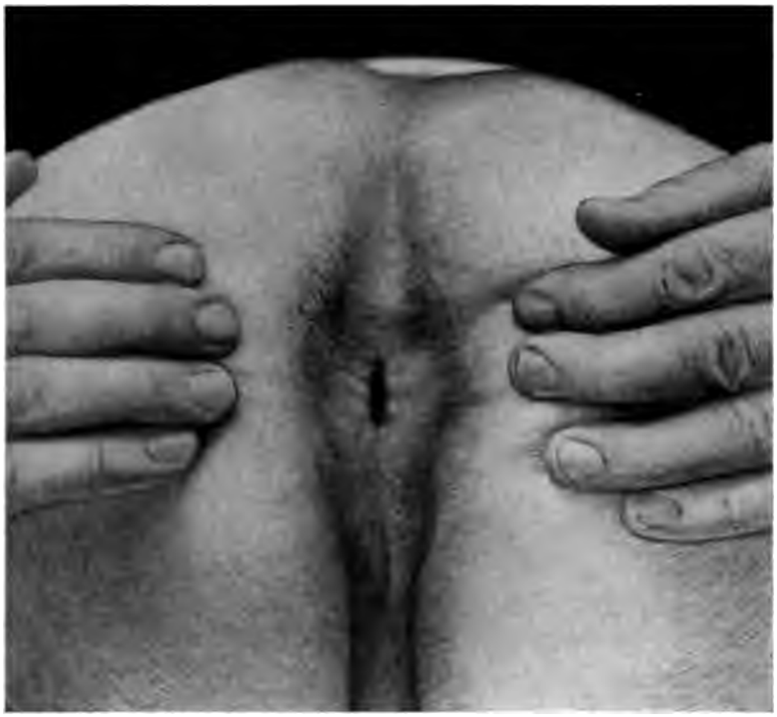

Fig. 230.—Relaxed anus. In this type of cases the sphincter does not require divulsion or division (even though the patient be constipated), because it is already loose and does not obstruct the passage of the feces.

When the sphincter is very thick and has undergone fibrous degeneration, I prefer a complete *division* to divulsion, because it permanently increases the caliber of the anal outlet, while divulsion does not.

I never employ general anesthesia when I *divide* an hypertrophied sphincter, because it can be severed painlessly under local anesthesia, and this requires but a moment. The operation is performed exactly in the same way as division of the sphincter for the relief of fissure (Fig. 242).

Some writers advocate divulsion of the sphincter in practically all cases of constipation, but such a routine practice is absurd and pernicious, because it is not always indicated (Fig. 230), and further, because the indiscriminate stretching of the muscle may lead to incontinence. It is well enough to increase the anal outlet when it is tightly contracted and small, but there is absolutely no use in divulsing the anus or dividing the sphincter when relaxed (Fig. 230), as is often inexcusably done as a routine measure by certain practitioners in the treatment of constipation.

TREATMENT OF DEVIATED COCCYX

When the lower segments of the bone project, carrying the rectum along and obstructing the descent of the feces, they should be removed.

Excision of the coccyx, as usually performed, takes twenty minutes or longer and is often accompanied by profuse bleeding. My way of operating[1] is practically bloodless, never takes more than three minutes, and the only instruments required are a Hagedorn needle and a heavy pair of blunt scissors.

The skin and subcutaneous tissues are grasped with the thumb and fingers of the left hand and thrown into a transverse fold at the lower end of the coccyx; then, with one stroke of the scissors made parallel with the long axis of the bone, the tip of the coccyx is reached; with a second cut, the end of the bone is freed, with a third and fourth the attachments of the right and left sides of the coccyx are divided, and with the fifth, which is made at a right angle, the offending segments of the coccyx are detached and removed.

To avoid injury to the deeper vessels and those running along the posterior rectal wall the blunt ends of the scissors are directed outward, except while the first and second cuts are being made. In case of oozing, which is exceptional, the bleeding can be quickly arrested by momentarily packing the wound with gauze wrung out of boiling water. The wound is then closed by two or, at most, three interrupted chromicized catgut sutures, and is then covered by a dry dressing, which is retained in place by adhesive straps and a T-binder.

In excising the coccyx care is needed to see that no spiculæ of bone are left behind to cause postoperative pain.

I have succeeded in curing 4 patients (3 women and 1 man) of obstinate constipation of years' standing by this simple procedure.

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[1] Gant, *Diseases of the Rectum and Anus*, third edition.

CHAPTER XLIV

NON-OPERATIVE AND SURGICAL TREATMENT OF DISEASES OF THE RECTUM AND ANUS

Rectal Polyps. Hemorrhoids. Fissure in Ano. Ulceration. Fistula in Ano.

Treatment of Rectal Polyps.—A single polyp having a long pedicle may rest upon the upper extremity of the anal canal (Fig. 232) and prevent an evacuation by acting as a valve or exciting sphincteric contraction, or constipation may be induced by large multiple polyps (Fig. 74) which obstruct the rectum. Polyps which protrude may be ligated and cut off or may be removed by the clamp and cautery. When situated higher up they are located by the aid of the proctoscope and twisted off (torsion), or they may be removed by placing a Gant valve clamp (Figs. 225, 226) upon the pedicle at its attachment, which causes them to come away by pressure-necrosis.

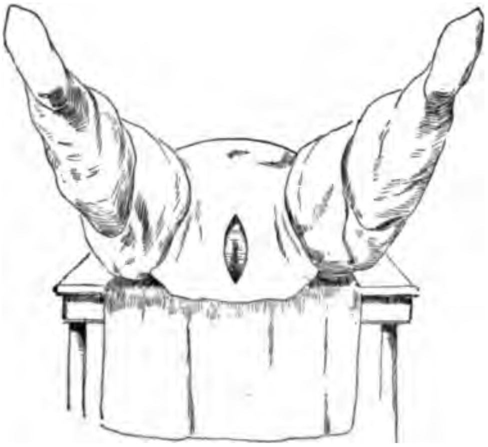

Fig. 231.—Patient prepared and in position for rectal operation.

When these tumors are very numerous or scattered throughout the colon, causing obstruction and a foul discharge, nothing short of excision, exclusion of the diseased gut, or colostomy will give the desired relief.

Treatment of Hemorrhoids.—Hemorrhoids are of two kinds: *external*, when covered by the skin; *internal*, when they have a mucous covering. They may induce constipation by blocking the rectum when of large size; by interfering with the fecal discharge through exciting spasmodic contractions of the sphincter when inflamed or strangulated; and by causing the patient to defer an evacuation as long as possible when a source of painful defecation.

The treatment of piles may be *palliative* when the patient desires relief from bleeding or pain, or *surgical* when a permanent cure is his object.

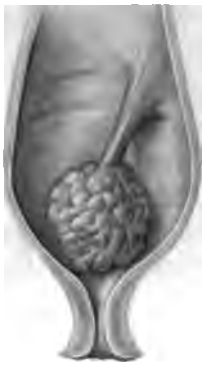

Fig. 232. Rectal polyp which blocked the anal canal (author's case).

The palliative treatment of external and internal hemorrhoids is very much the same in the presence of inflammation and swelling. A great deal can be accomplished by the constant application of the ice-bag to the anus, while the intense pain and sphincteralgia are amenable to continued hot fomentations or poultices, which have a soothing effect and cause the muscle to relax.

Constipated subjects who are afflicted with hemorrhoids should be advised to adhere to a simple diet, keep regular hours, abstain from alcoholic drinks, and take a moderate amount of outdoor exercise, except when the hemorrhoids are protruded or inflamed. An effort should be made to bring about one soft evacuation daily.

Remedies which excite violent peristalsis and a number of fluid stools should not be prescribed because they induce tenemus, cause the piles to protrude, increase sphincteric irritability, and produce an unnecessary amount of pain. Small doses of cascara, sal-hepatica, licorice powder, one of the salines, or a dinner pill will ordinarily secure the coveted movement, and when the result is unsatisfactory, a vegetable or mineral oil should be administered to lubricate the intestine and facilitate defecation.

When hot and cold applications and efforts at regulating the diet and evacuations fail to diminish pain and lessen sphincteric contraction, recourse must be had to medication. In some instances the congestion and sphincteralgia can be rapidly removed and the tumors made to return above the external sphincter by bathing the anus at short intervals with alum or other astringent solutions.

Freshly strangulated hemorrhoids should be gently manipulated upward and into the rectum, but when they have been down for a considerable time and have become edematous and painful, no effort should be made to return them until the swelling and irritation have been reduced by the applications named, because they would immediately protrude again.

When prolapsed piles cause excruciating pain, it can usually be relieved by having the patient take a hot (110° F.) sitz-bath (Fig. 108) or by injecting into the rectum 2 ounces of hot oil or a similar amount of starch-water, containing a teaspoonful of laudanum, every three or four hours. If these remedies do not give relief, or act too slowly, ¼ grain of morphin should be injected beneath the skin, or a suppository containing ¼ grain of opium or cocain and ½ grain of the extract of belladonna should be inserted as often as may be necessary to stop the pain. When hemorrhoids are ulcerated and sore and the skin is excoriated, while the patient does not suffer too intensely, much can be done to add to his comfort by the use of one of the following soothing salves, applied night and morning by means of the pile ointment pipe (Fig. 233):

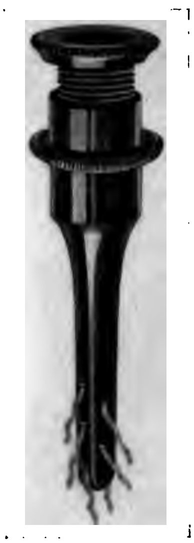

Fig. 233.—Pile ointment pipe.

℞.	Ungt. stramonii	ʒiss	6
	Ungt. belladonnæ	ʒiiss	10
	Ungt. acidi tannici	℥ss	15

Misce.

Sig.—Apply inside and outside the anus. (GANT.)

℞.	Morphinæ sulphatis	gr. iij	195
	Hydrargyri chloridi	gr. xij	78
	Lanolini	℥j	31

Misce.

Sig.—Apply freely to piles and anal canal. (GANT.)

℞.	Ext. opii	ʒss	2
	Cocainæ hydrochloratis	gr. x	65
	Menthol	gr. xx	1 30
	Ungt. zinci oxidi	℥j	30

Misce.

Sig.—Apply to piles. (GANT.)

Falk recommends the following combination for the relief of painful hemorrhoids:

℞.	Cocainæ hydrochlor. Morphinæ sulphatis	āā gr. vj	39
	Ext. belladonnæ Liquor plumbi subacetatis	āā ʒss	2
	Ungt. stramonii	ʒv	20
	Ungt. acidi tannici	℥iij	90

Misce.

Sig.—Use through pile pipe.

The **surgical treatment of hemorrhoids** is always satisfactory, and the operation can be done under local anesthesia induced by sterile water or ⅛ of 1 per cent. eucain solution, except when there exists some other complication. Local anesthesia should not be employed when hemorrhoids are associated with some other serious rectal affection which needs attention.

External thrombotic hemorrhoids are anesthetized by the injection of a sufficient amount of the eucain solution to cause the pile to turn white; it is then transfixed with a sharp-pointed curved bistoury, slit open, the clot turned out, and the wound drained to prevent refilling of the tumor. The subsequent dressings consist in cleansing the parts and reinserting the gauze until the wound is healed.

External cutaneous hemorrhoids are quickly removed with knife or scissors after they have been injected with the eucain solution. Anesthesia is absolute and follows within a few seconds from the time the injection is made. After the excision of cutaneous piles the wound may be closed with catgut sutures or permitted to heal by granulation, the latter method being preferable, because it induces less pain and is not likely to be followed by infection.

Many surgical procedures have been suggested for the relief and cure of *internal* hemorrhoids, some being simple and effective, while others are more elaborate, unsatisfactory, and often followed by unpleasant sequelæ. Named in the order of their popularity, these operations are the *ligature, clamp and cautery, excision,* and the *injection method.*

Of these procedures, the ligature is the oldest, most generally used, as reliable as any, is rarely followed or accompanied by hemorrhage or complications, and the results are all that could be desired. The technic of this operation is very simple and can be carried out under local or general anesthesia. Except when there is some special reason for administering gas or ether, I perform the operation under sterile water or eucain (⅛ of 1 per cent.) anesthesia. The hemorrhoid is brought into view by means of a small enema, having the patient strain, everting the anus, or by tilting the fenestrated speculum as it is withdrawn.

The pile is then injected with water or eucain solution until it turns white, which indicates complete anesthesia (Fig. 234). The next step in the operation consists in drawing the tumor downward at the same time as the speculum is tilted (Fig. 235) and severing it at the mucocutaneous junction with scissors (Fig. 236). A fine but strong linen ligature is placed in the incision (Fig. 236) and the hemorrhoid is drawn upward, ligated, and excised, leaving a sufficient stump to retie the ligature and prevent bleeding (Fig. 236).

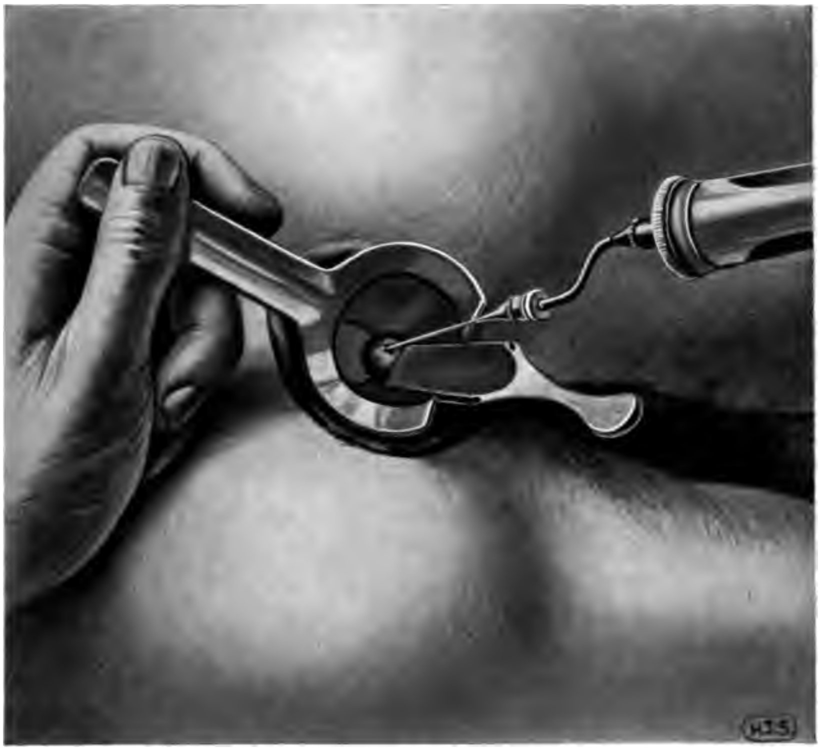

Fig. 234.—Method of anesthetizing the pile in the author's local anesthesia operation for hemorrhoids.

The remaining tumors are each in turn treated in the same manner, and the operation is completed by gently pushing the ligated stumps above the sphincter, as the patient draws the parts upward. A thick wedge-shaped gauze pressure-pad is then placed over the anus to prevent and arrest bleeding after a strong T-binder has been snugly applied.

When the piles are high, it at times becomes necessary to use a long needle and inject them through the opening in the speculum (Fig. 234), after which they are seized and brought downward into the field of operation. It requires a greater amount of skill to do a radical operation for hemorrhoids under local anesthesia than the inexperienced would believe.

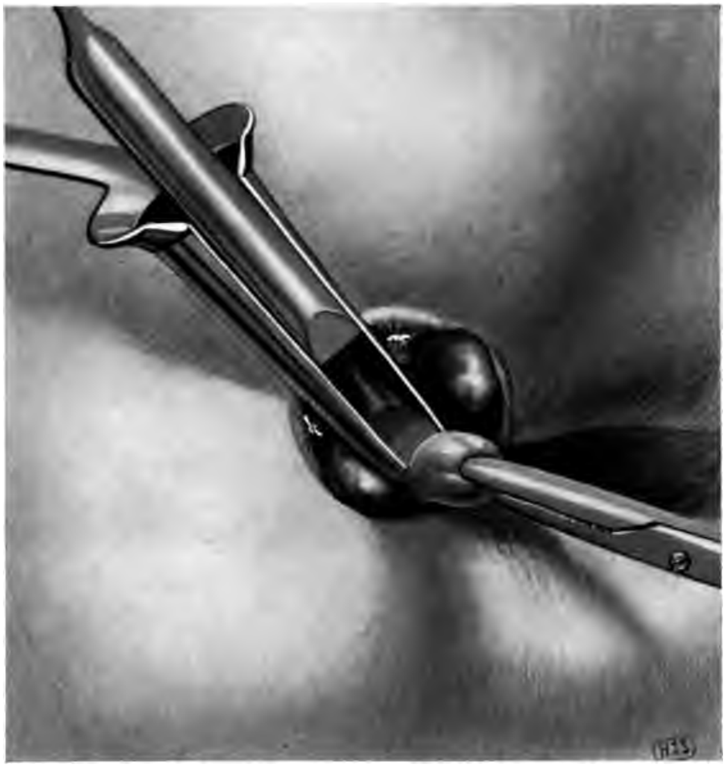

Fig. 235.—Method of bringing the pile outside in the author's local anesthesia operation for hemorrhoids. The tumor is brought out into view by forceps, aided by the tilting of the speculum as it is withdrawn.

When general anesthesia is employed, ligaturing is preceded by divulsion of the sphincter.

Formerly, my patients operated upon by the ligature method suffered considerably, and it often became necessary to catheterize them, but since I have discarded the large, heavy, and harsh plaited silk for the small but strong linen thread, they are rarely bothered with either pain or the necessity for catheterization.

Clamp-and-cautery Operation (Fig. 237).—The steps in this procedure are exactly the same as in the ligature operation, up to and

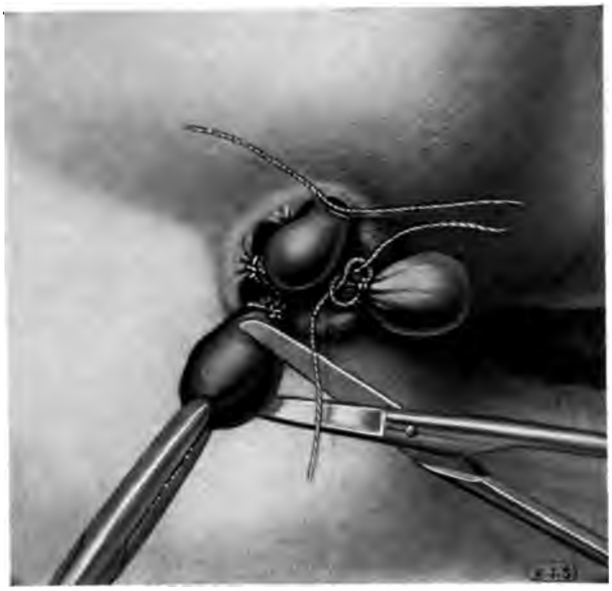

Fig. 236.—Showing progressive steps in the author's local anesthesia operation for hemorrhoids.

including the cut at the mucocutaneous juncture (Hilton's white line). The pile is then drawn downward with forceps (Fig. 238), clamped at the point of incision, excised with scissors, and the stump thoroughly burned with a Paquelin cautery. After the other hemorrhoids have been removed in the same way, the stumps are greased with sterile carbolized vaselin, returned within the bowel, and the dressing completed as in the ligature operation. A hemorrhoid which has been cauterized should not be sponged or otherwise fooled with, because when the burned surface is broken a hemorrhage will certainly follow.

Rectal tubes and gauze plugs should not be employed, for their removal is often attended with excruciating pain or bleeding. Moreover, they are unnecessary when the operation has been properly performed.

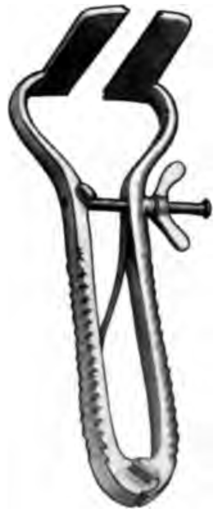

Fig. 237.—Author's pile and polypus clamp.

The clamp-and-cautery operation is radical, causes but little suffering and subsequent trouble, and can be painlessly performed under local anesthesia, but it is not so satisfactory as the ligature method, where a general anesthetic is omitted, because the patient is afraid of the glowing cautery.

Excision.—There are several ways of excising piles, some of which are easy and others quite difficult. The most elaborate technic is that of Whitehead, which consists in excising the lower 2 inches or pile region and uniting the divided mucosa with the skin. This procedure appeals to the general surgeon, but is rarely ever performed by the proctologist, and then only in a modified form, because it is difficult, bloody, and followed by delayed healing, pain, stricture, incontinence, incurable ulceration, loss of sensibility at the anal outlet, intolerable itching or other complications when primary union fails. I do not believe that it is ever justifiable to perform this operation for the relief of ordinary hemorrhoids.

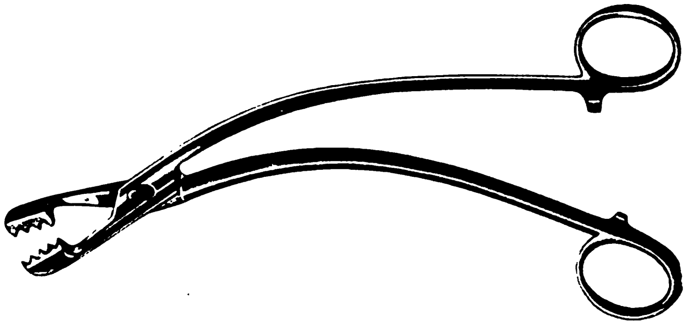

Fig. 238.—Author's hemorrhoidal forceps.

A simple way of excising hemorrhoids is to seize each tumor in turn, cut it off with one stroke of the scissors, ligate bleeding vessels, and rapidly close the wound with a running suture of catgut, or permit it to heal by granulation; or the tumor may be removed in successive steps by first cutting and then suturing, and so on, until it is excised and the wound closed (Mummery). The greatest advantage of these simple procedures over that of Whitehead is that a stricture will not follow because healthy strips of mucosa are left between the denuded surfaces.

The Injection Treatment (*Operation*).—Since the popularization of the operative treatment of hemorrhoids under local anesthesia, this once much-used procedure has lost rapidly in favor, and is rarely employed at the present time by regular physicians.

The injection of protruding and bleeding internal hemorrhoids with a 30 per cent. solution of carbolic acid very often works like magic, and relieves the patient almost immediately without detaining him from business or causing pain; but at other times, although the same precautions have been taken, the injection may be followed shortly by considerable swelling, great pain, sphincteralgia, sloughing, abscess and fistula, phlebitis, pyemia, a tedious protracted treatment, and an imperfect result. Death from embolism has been reported after this procedure. I see no occasion for further resorting to it, because under local anesthesia hemorrhoids can be painlessly removed within five minutes, causing very brief interference with the patient's business, and giving the assurance of a permanent cure without dangerous and distressing complications either during or after the operation.

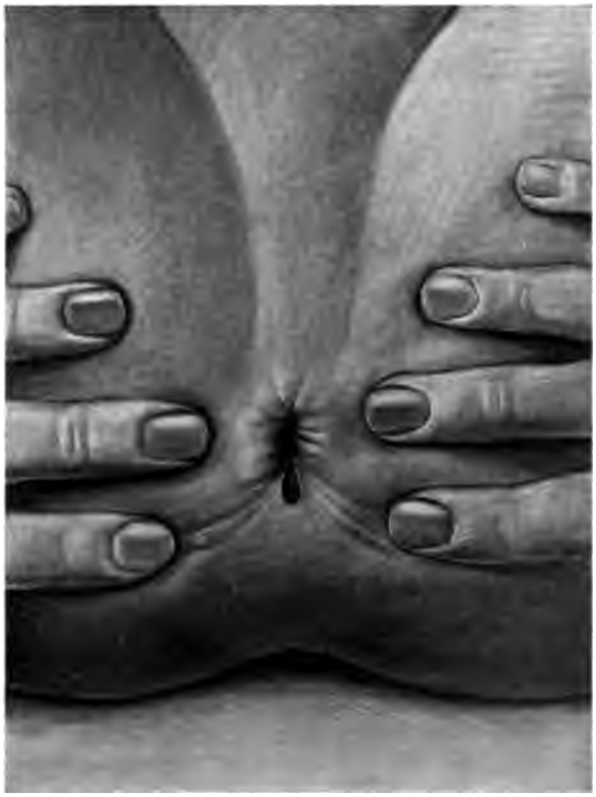

Fig. 239.—Fissure in ano.

Treatment of Fissure in Ano (*Painful Ulcer*).—Fissure in ano (Fig. 239) invariably induces obstinate constipation because of the obstruction to the passage of the feces caused by the irritable sphincter which results, and the deferring of the evacuations owing to the intense sphincteralgia and pain which accompanies and follows the act of defecation.

The treatment of this distressing affection is universally successful when properly carried out, but is exceedingly painful and often fails when improperly done.

The treatment of painful ulcer or fissure is simple and may be ***non-operative*** or ***surgical***. The latter is the method of choice in most instances because it induces less suffering, is more often successful, and the cure can be accomplished in a shorter time than when topical applications are made.

Non-operative Treatment.—The most essential features in the non-operative treatment of anal fissure are to keep the rent clean and, when necessary, drained, to secure daily soft evacuations, to allay pain, and to make topical applications which will encourage healing.

The anus should be bathed twice daily with absorbent cotton dipped in boric acid or other warm antiseptic solution in order to cleanse the wound and skin of the discharge, which would otherwise cause excoriation and distressing pruritus. When this part of the toilet has been completed, the fissure is cleansed, using moist cotton upon an applicator or toothpick; this procedure skilfully done causes little if any pain, but when it does, it can be prevented by placing in the wound a pledget of cotton saturated with a 6 per cent. eucain solution.

Stick silver, copper sulphate, and similar agents should never be employed in the treatment of fissure because they do little good, induce much suffering, and increase the irritability of the sphincter muscle. The most reliable agents to employ are: ichthyol, 20 per cent., silver nitrate, 6 per cent., and balsam of Peru. Formerly I painted the ulcer with the solution, but a larger experience has demonstrated that quicker and better results are obtained when a small piece of gauze, moistened with the solution, is left on the wound to stimulate and drain it. Eucain used in the cleansing process renders the otherwise sensitive wound ready for the topical application.

Under no circumstances should a speculum be employed in these cases, because it is not necessary to bring the fissure into view, but may stretch the ulcer and induce much unnecessary suffering.

Orthoform, analgin, salicylate of soda, and calomel are the most serviceable powders to use for the relief of this condition. Personally, I rarely use powders, because they are no more effective than the above-named remedies and are inclined to become caked and induce pain or itching.

When the skin of the anogluteal region is excoriated, the following dusting-powder will add materially to the comfort of the patient:

℞.	Hydrarg. chlor. mit. Zinci stearatis cum balsami Peru	āā ʒij	8
	Sodii salicylatis	ʒj	4

Misce.

Sig.—Dust over the affected parts two or three times a day. (GANT.)

Large hardened evacuations prevent healing of the fissure because they tear the wound and excite sphincteric contraction, which in turn causes agonizing pain and squeezing of the sore, and this adds to the irritation of the fissure and prevents its healing. Frequent fluid stools are also undesirable, for they often fill the wound with feces and induce much straining.

In the handling of this class of cases, it is desirable to secure two semisolid evacuations daily, preferably, one after breakfast and the other in the evening. Two such stools do less harm than one large evacuation, and induce less irritation because the feces are smaller and softer. These patients can usually judge if the feces are hard in advance of the movement, and I instruct them to squeeze the posterior anal commissure during the passage of hardened feces to prevent stretching of the fissure; this procedure invariably saves the patient much suffering.

Stools of a suitable consistence can usually be secured by the nightly administration of Carabana water, cascara sagrada, or one of the dinner pills to be found in the Formulary. When the feces, in spite of these remedies, are inclined to become dry and knotty, neutralol, albolin, liquid paraffin, or olive oil should be administered in liberal doses once or twice daily, to lubricate the intestine and soften the evacuations.

The pain from fissure is rarely continuous, is slight during defecation, and most severe shortly afterward. The passage of the excrement causes temporary tearing, stinging pain at the site of the lesion, but this the patient does not mind so much as the dull agonizing pain which comes on later, accompanied by sphincteric spasm, located in the sacrococcygeal region, sometimes lasting from thirty minutes to several hours.

In the majority of instances the intense pain following an evacuation can be quickly and effectively stopped by the application to the anal region of a hot-water bag, continuous hot fomentations, or the injection of 2 ounces of hot (100°–110° F.) oil into the rectum, which gives relief by soothing the irritable sphincter muscle and causing it to relax. When heat fails to give the desired result, suppositories containing opium, morphin, cocain, eucain, belladonna, conium, or stramonium, alone or in combination, should be inserted as often as may be required to relieve pain and secure sleep.

Much suffering can be avoided in aggravated cases by having the patient insert a suppository immediately following each stool. In some instances, postdefecatory pain can be prevented by the application to the fissure, just prior to stool, of a pledget of cotton saturated with eucain or cocain.

Either of the accompanying formulæ, when applied by means of a pile pipe (Fig. 233), will add to the patient's comfort:

℞.	Hydrarg. chlor. mit. Ext. belladonnæ	āā ʒj	4
	Ungt. stramonii	q. s. ad ℥j	30

Misce et fiat unguentum.

Sig.—Apply as often as required. (GANT.)

℞.	Morphinæ sulphatis	gr. ¼	015
	Ext. belladonnæ	gr. ss	03
	Lanolin	ʒj	4

Misce.

Sig.—Apply after each movement and repeat if necessary. (GANT.)

Surgical Treatment.—When non-operative measures have been intelligently tried and have failed, a surgical operation should be performed without further delay.

Three surgical procedures—*incision*, *divulsion*, and *excision*—are recommended for the radical cure of painful ulcer. Fissures do not heal because the wound obtains little rest, owing to frequent sphincteric contraction, consequently it is necessary, in choosing an operation, to select one which will completely arrest sphincteric irritation.

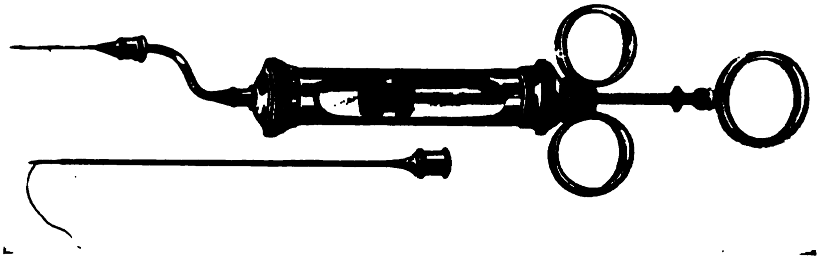

Fig. 240.—Author's goose-necked anesthesia syringe, serviceable for fissure, hemorrhoidal fistula, and other operations in the anorectal region.

The *incision* (division) operation is the simplest and most reliable procedure, causes the least postoperative suffering, and obtains the quickest results. Formerly I favored divulsion, but now I always completely incise the muscle because this never fails to put it at rest and allow the wound to heal and, in addition, widens the anal outlet and lessens the possibility of a future tear. In my earlier operations I introduced into the rectum a curved short-pointed bistoury and divided the sphincter by withdrawing it. The operation immediately arrested sphincteralgia, but the wound required from three to seven weeks to heal. Finally, I decided that the delayed healing was due to improper drainage of the cup-shaped cut. Working with this idea in view, I devised the new technic which, for a number of years, has given entire satisfaction.

My operation is very simple, requires not more than three minutes, and is invariably performed under local anesthesia. By means of my goose-necked anesthesia syringe (Fig. 240), a few drops of sterile water or a ⅛ of 1 per cent. eucain solution is injected into and beneath the skin at a point ½ inch directly behind the posterior anal commissure (Fig. 241). The needle is then pushed forward and the muscle and lower rectum are anesthetized. Using a pair of scissors having one sharp- and one probe-pointed blade, I pass the sharper of the two through the tissues and upward and posteriorly to the bowel wall for a distance of 1 inch; at the same time the probe-pointed blade is passed up the rectum for a similar distance (Fig. 242). With one cut the skin and the external sphincters are divided (Fig. 242), leaving a clean-cut triangular-shaped wound, more than 1 inch in length, which can be perfectly drained at all times by the insertion of a small piece of gauze. Afterward the wound is treated exactly as after a fistula operation. Very

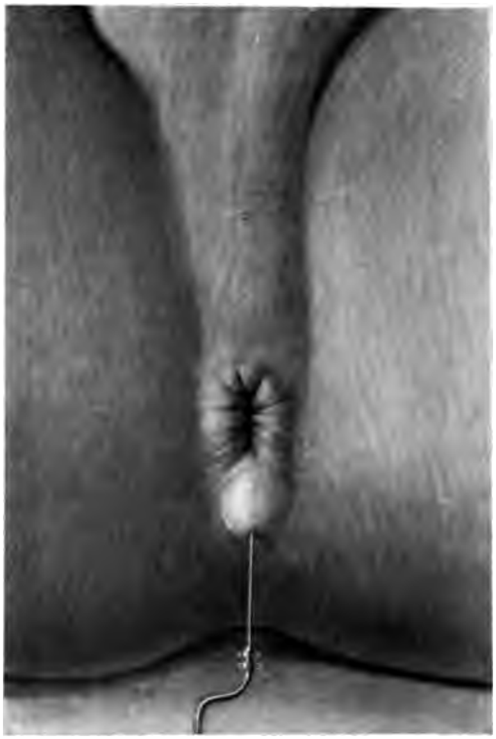

Fig. 241.—Method of producing anesthesia in author's operation for fissure in ano.

good results can be obtained by dividing the muscle in the posterior median line (Figs. 242, 243, A), either side, or by a double or V-shaped incision (Fig. 243, B). Some surgeons advise *partial* division of the sphincter in the curative treatment of fissure, but this procedure is unsatisfactory because of difficulty encountered in knowing how far to cut and, further, because it does not insure the complete rest of the muscle, which is so essential for a cure.

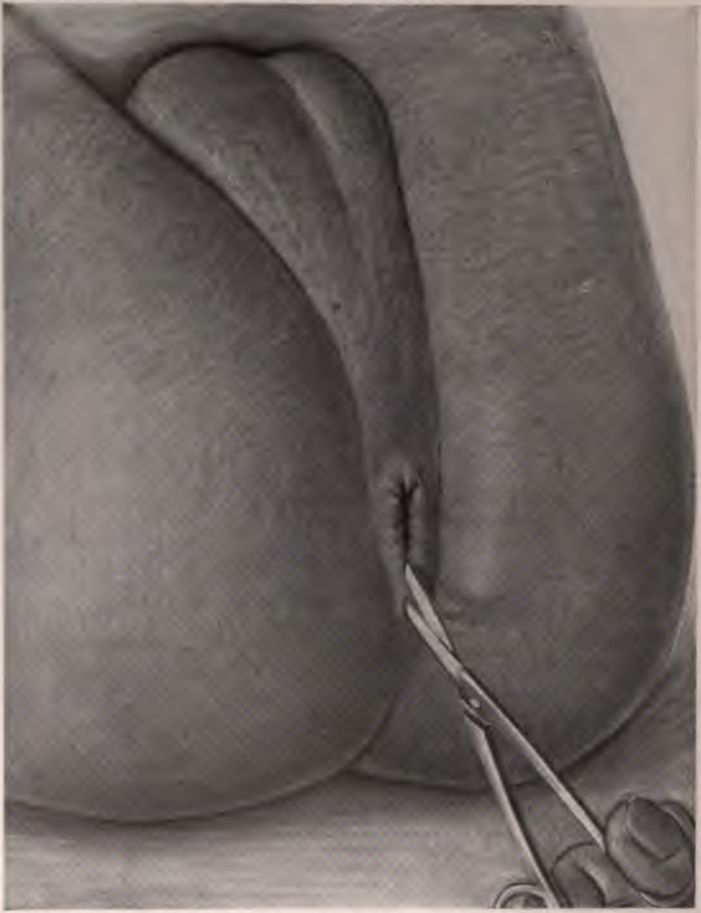

Fig. 242.—Showing method of dividing the sphincter in author's operation for fissure in ano.

Divulsion is popular in some quarters, but I have discontinued it because the temporary paralysis induced by the stretching does not always last long enough to permit the fissure to heal. Divulsion of the sphincter may be accomplished gradually by the aid of bougies and anal dilators, or quickly by dilating the anus with the thumb and fingers while the patient is under anesthesia. I have known several instances of complete incontinence which followed forcible anal divulsion with mechanical dilators.

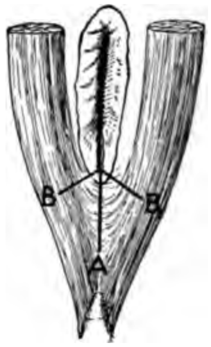

Fig. 243.—B shows the V-shaped and A the posteromedian incision as practised in the treatment of fissure in ano.

Excision of fissures is now rarely practised because it has been found both unnecessary and unsatisfactory. This procedure consists in trimming off the edges of the fissure and closing the wound by sutures or permitting it to heal by granulation. This operation is ineffectual, except when it is accompanied by division or divulsion of the sphincter.

Ulceration.—Simple ulcers at the anal margin and fissure aggravate the constipated state through causing sphincteric irritation. When rectal ulcers are of tuberculous or syphilitic origin the patient requires both local (Fig. 244) and constitutional treatment. Tuberculous ulceration is difficult to cure, and healing progresses faster when soothing remedies are used than when caustic applications are made.

Syphilitic lesions do well if taken early when the patient is placed upon antisyphilitic treatment, and they are frequently cleansed and covered with calomel or one of the mercurial ointments, but when they do not heal, they should be cauterized with the Paquelin cautery and the sphincter muscle divided if necessary.

Fig. 244.—Author's rectocolonic ointment applicator, useful in the treatment of ulcers located in the upper rectum and sigmoid.

Other types of ulcers require exactly the same treatment as do fissures.

Treatment of Fistula in Ano.—Fistulæ which open through or adjacent to the sphincter muscle, and those which give off an irritating discharge that keeps the anus excoriated, may induce constipation by exciting prolonged sphincteric contraction and by causing pain during stool, which leads the patient to defer an action as long as possible.

Small blind internal fistulæ (Figs. 245–247) are more apt to cause constipation than complete fistulæ (Fig. 248). On account of their size and location, the majority of sinuses can be operated upon under local anesthesia and require but a short time to heal. When the extent or direction of a fistula cannot be determined by probing, and when there is some other rectal complication, the patient should be sent to the hospital and the operation performed under general anesthesia, in order that the work may be thoroughly done.

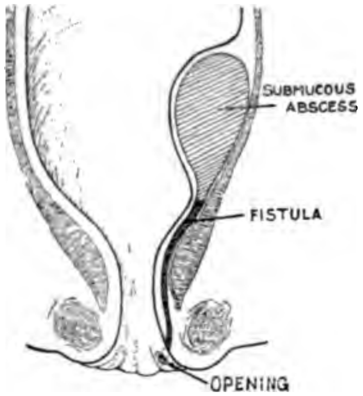

Fig. 245.—Submucous fistula, opening at the anal margin.

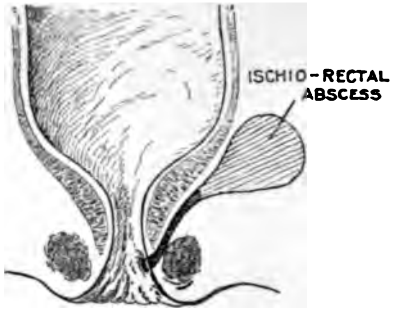

Fig. 246.—Ischiorectal abscess sinus, opening at the anal margin.

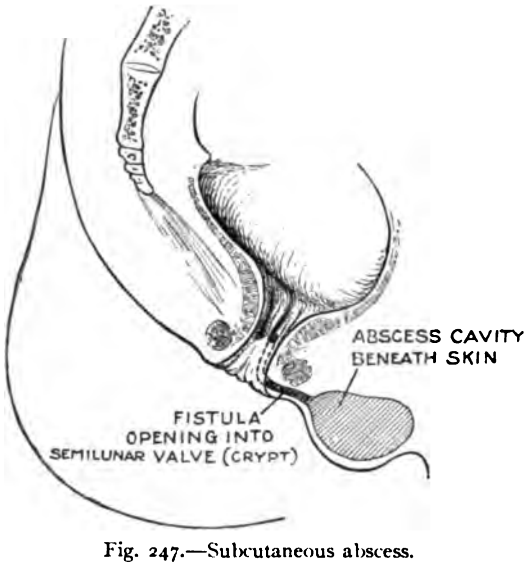
ABSCESS CAVITY BENEATH SKIN
FISTULA OPENING INTO SEMILUNAR VALVE (CRYPT)

Fig. 247.—Subcutaneous abscess.

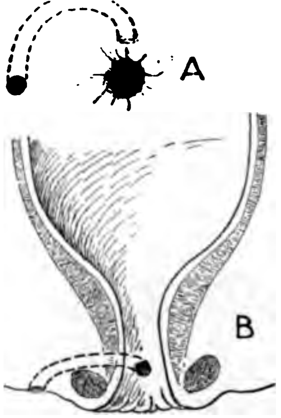

Fig. 248.—Ordinary or complete fistula, opening between the external and internal sphincter muscles: A indicates how the sinus curves above the rectum.

Complete fistula may be operated upon by either the *division* or *excision* method.

Division is the most popular procedure because the technic is simple, it requires but a short time, and the results are almost universally satisfactory. When the sinus is divided under local anesthesia the tissues immediately above it are injected with a ⅛ of 1 per cent. eucain solution until blanched, an indication that anesthesia is complete, care being taken to prevent the needle from entering the tract.

When operating upon *complete fistula*, the end of the groove director is passed through the outer opening and into the bowel, where it is hooked up by the index-finger of the left hand and brought outside and across the anus, where all overlying tissues are quickly divided with a sharp-pointed curved bistoury, or the director may be dispensed with and the tract divided by the aid of probe-pointed scissors.

The technic of *excision* differs materially from that of division just described. Here a probe is introduced through the sinus and brought out through the anus, where the two ends are twisted together; then it is used both as a guide and tractor, while the sinus is quickly dissected out with knife or scissors by a succession of strokes made on either side. As soon as the tract has been removed, the divided ends of the sphincter and the edges of the wound are quickly and accurately approximated with chromicized gut, after which a dry dressing is applied and held in position by a T-binder.

Blind internal fistulæ are more difficult to operate upon than the variety just described because the sinus is usually irregular and there is no external opening to serve as a guide in locating it. The outlet of an internal fistula is difficult to find because of its small size or its concealment by a fold of mucosa. Ordinarily, the outlet and direction of the tract can be determined by palpation, stripping it free of discharges with the thumb, or by examining and probing the anal outlet through a slit in the speculum. When the tract passes from the opening directly upward beneath the mucosa, a straight director is passed through the outlet and upward until the top of the sinus is reached, when the overlying mucous membrane is severed.

Blind internal fistulæ which run downward and under the sphincter or skin are more difficult to handle and much skill is required to cure them. Formerly, time was lost and occasionally false passages were made by the surgeon in his attempts to locate the sinus by cutting down through the skin. Operations upon this class of fistulæ have been very much simplified since I devised my angular groove director (Fig. 249), and this procedure is now carried out as follows: The director is pushed up the rectum until the probe point can be made to enter the opening, when it is drawn downward through the sinus until it causes a bulging of the skin. This or lower end of the director is then brought out through a small opening made in the integument, and the upper from the rectum, and allowed to rest across the anus while the tissues lying upon it are severed, as in the operation for complete fistula.

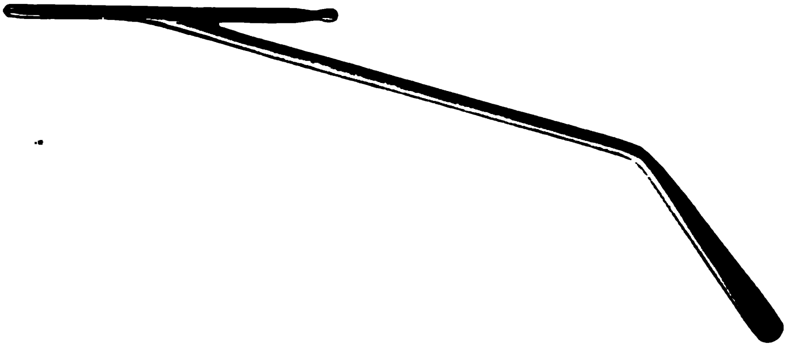

Fig. 249.—Author's angular director, designed for operations upon blind internal fistula.

In case this instrument is not at hand, the indurated tract should be located by palpation and cut down upon, after which the director is introduced from without and the sinus severed in the usual way.

There need be no fear of incontinence following fistula operations when the sphincter is cut at a right angle and the skin and mucous membrane are prevented from growing into the gully-like wound. The dressings should be changed as soon as they become soaked and should not be packed tightly when replaced, in order not to destroy fresh granulations and delay the process of repair.

Constipation induced by fistula is usually relieved as soon as the sphincter has been divided.

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